ThruBit
A Schlumberger Company

ARRAY INDUCTION
GAMMA RAY
MEMORY LOG

Company	ENCANA OIL & GAS (USA) INC.
Well	KERR 1H-2
Field	KERR
County	NESS
State	KANSAS

Company ENCANA OIL & GAS (USA) INC.

Well KERR 1H-2

Field KERR

County NESS State KANSAS

Location: API # : 15-135-254490000

SHL: 249' FSL & 1989' FEL
PBHL: 330' FNL & 2275' FEL
SEC 1 TWP 20S RGE 25W

Other Services: SONIC

Permanent Datum	G.L.	Elevation 2358'	Elevation K.B. 2372.1'
Log Measured From	K.B. 14.1' ABOVE PERM DATUM		D.F. 2372.1'
Drilling Measured From	K.B.		G.L. 2358'

Date	19 SEPTEMBER 2012			
Run Number	ONE			
Depth Driller	8806'			
Depth Logger	8760'			
Bottom Logged Interval	8750'			
Top Log Interval	4862'			
Casing Driller	7.0" @ 4864'			
Casing Logger	4862'			
Bit Size	6.125'			
Type Fluid in Hole	WBM			
Density / Viscosity	8.9 / 28			
pH / Fluid Loss	10.0 / 90			
Source of Sample	MUD PIT			
Rm @ Meas. Temp	3.08 ohms @ 69 degf			
Rmf @ Meas. Temp	2.31 ohms @ 69 degf			
Rmc @ Meas. Temp	3.85 ohms @ 69 degf			
Source of Rmf / Rmc	CALCULATED			
Rm @ BHT	1.27 ohms @ 130 degf			
Time Circulation Stopped	11:00 PM			
Time Logger on Bottom	12:30 AM			
Maximum Recorded Temperature	130 degf			
Equipment Number	T004			
Location	OKC, OK			
Recorded By	DENGLER			
Witnessed By	FRED SHEETS			

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Comments

SERVICE: HORIZONTAL PUMP DOWN MEMORY BIT DEPTH: 8678' LOGGED TO: 4862'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
LIMESTONE MATRIX, 2.71 g/cc. USED FOR POROSITY MEASUREMENTS
TOOLSTING RAN WITH SMALL DE-CENTRALIZER, SWIVEL,KNUCKLES, SONIC CENTRALIZER AND NO STANDOFFS
TBHV REPRESENTS TOTAL BORHOLE VOLUME, ft3
ABHV REPRESENTS ANNULAR HOLE VOLUME, CALCULATED FOR 4.5" CSG., ft3
RIGMINDER USED TO ACQUIRE LOG DEPTH
LOG CORRELATED TO MWD GR
RIG: PRECISION 209
CREW: J. DENGLER, K. REED, J. JONES

Service Ticket No.	1428	API No.	35-135-254490000	PGM Ver	WARRIOR 7.0

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

GAMMA RAY	NEUTRON	DENSITY	INDUCTION

Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	ENP2T	Serial No.	PS5N	Serial No.	PS41D	Serial No.	PS28R
Model No.	ENP	Model No.	PS	Model No.	PS	Model No.	PS
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"

LOGGING DATA

General Data

Pass	Depths		Well Head	Speed	Logging Run Comments
No.	From	To	Pressure	Ft/Min	
ONE	8760'	4862'		30	

	GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Pass	Scale		Scale		Scale		Scale	
No.	L	R	L	R	L	R	L	L
ONE	0 API	150 API	30%	0%	30%	0%	0.2 ohm-m	200 ohm-m

DIRECTIONAL INFORMATION

Maximum Deviation	93.0	deg. @	6120'	KOP	3594'	

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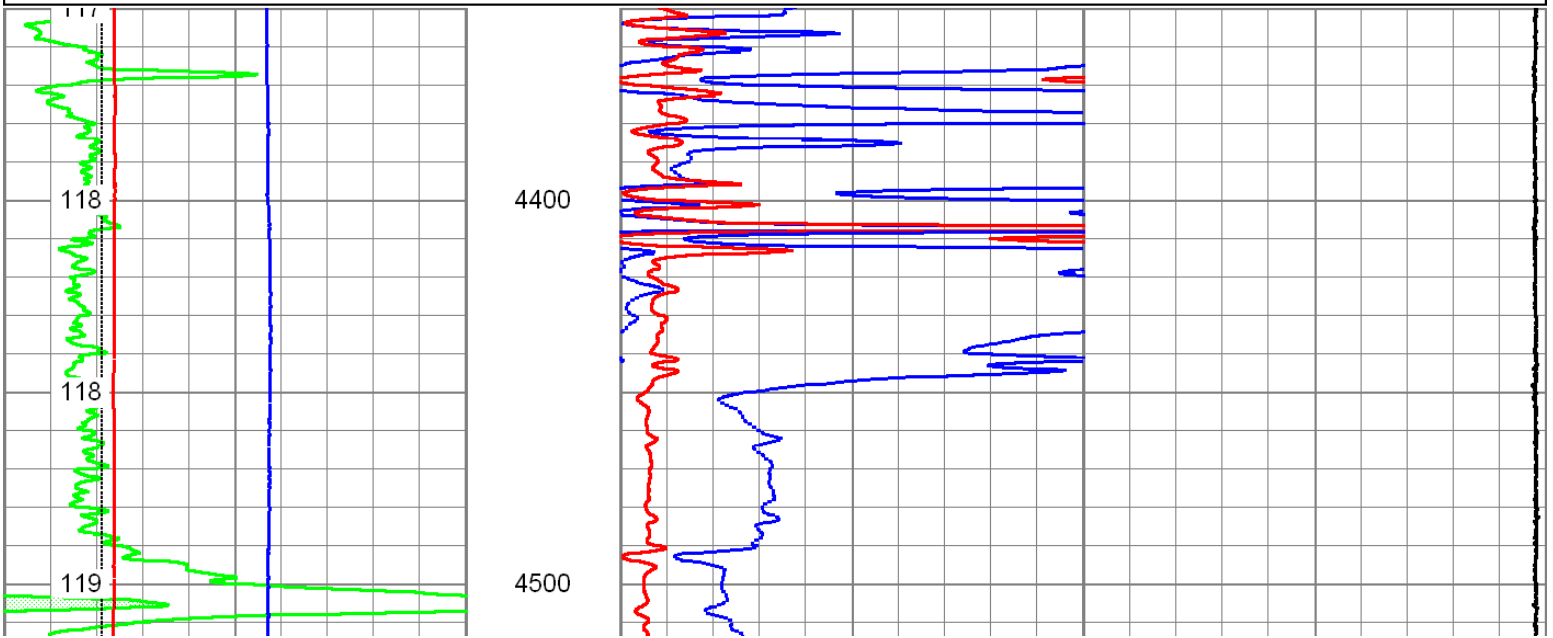
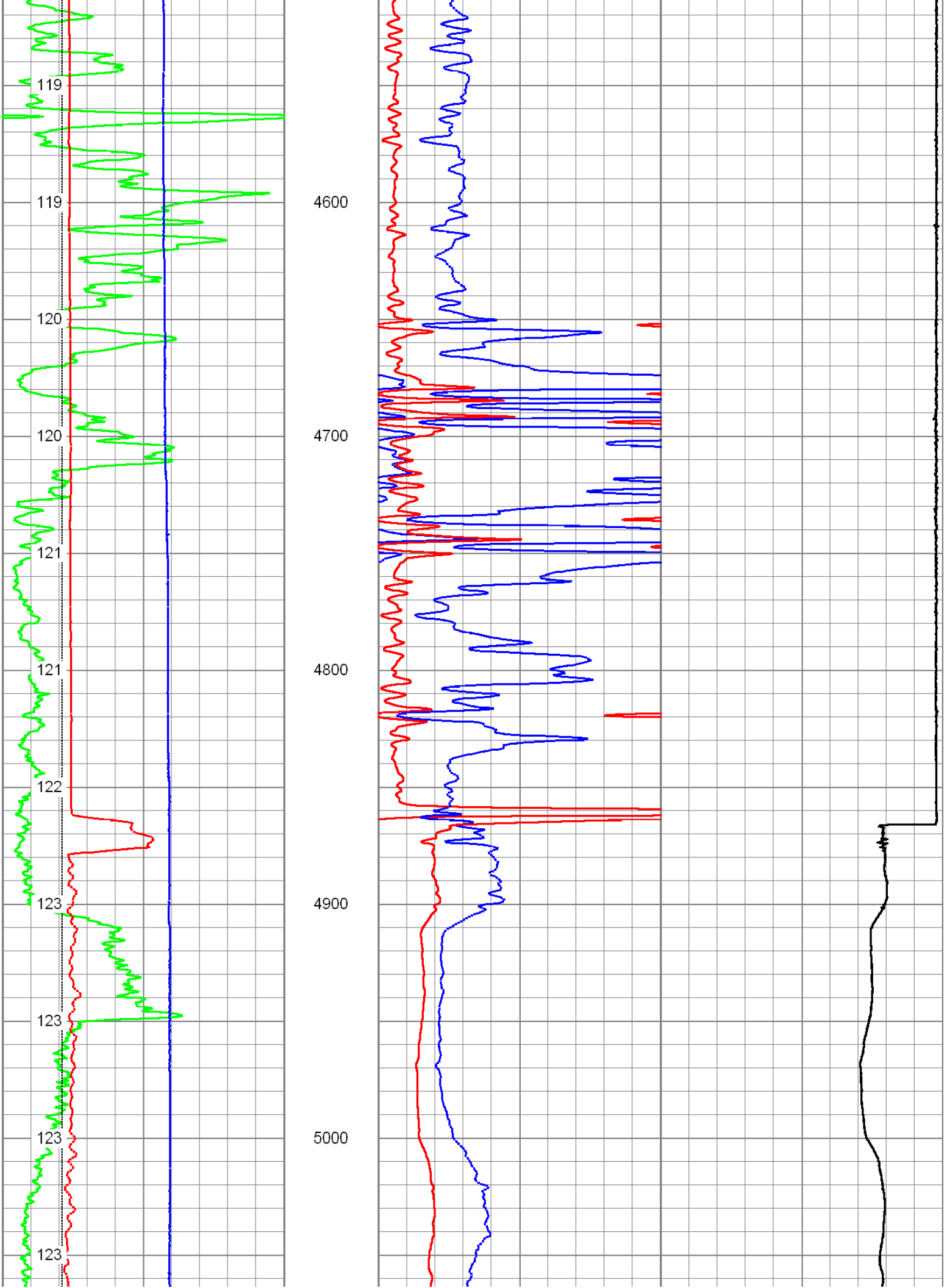
MAIN PASS

Database File: kerr_mem.db
Dataset Pathname: proc1/pass1.2
Presentation Format: 6_2r_chk
Dataset Creation: Wed Sep 19 11:30:58 2012
Charted by: Depth in Feet scaled 1:600

0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14
GRTEMP (degF)		

50	20in 2ft Res (Ohm-m)	500
50	90in 2ft Res (Ohm-m)	500
1000	DEEP COND (mmho/m)	0
0	20in 2ft Res (Ohm-m)	50
0	90in 2ft Res (Ohm-m)	50

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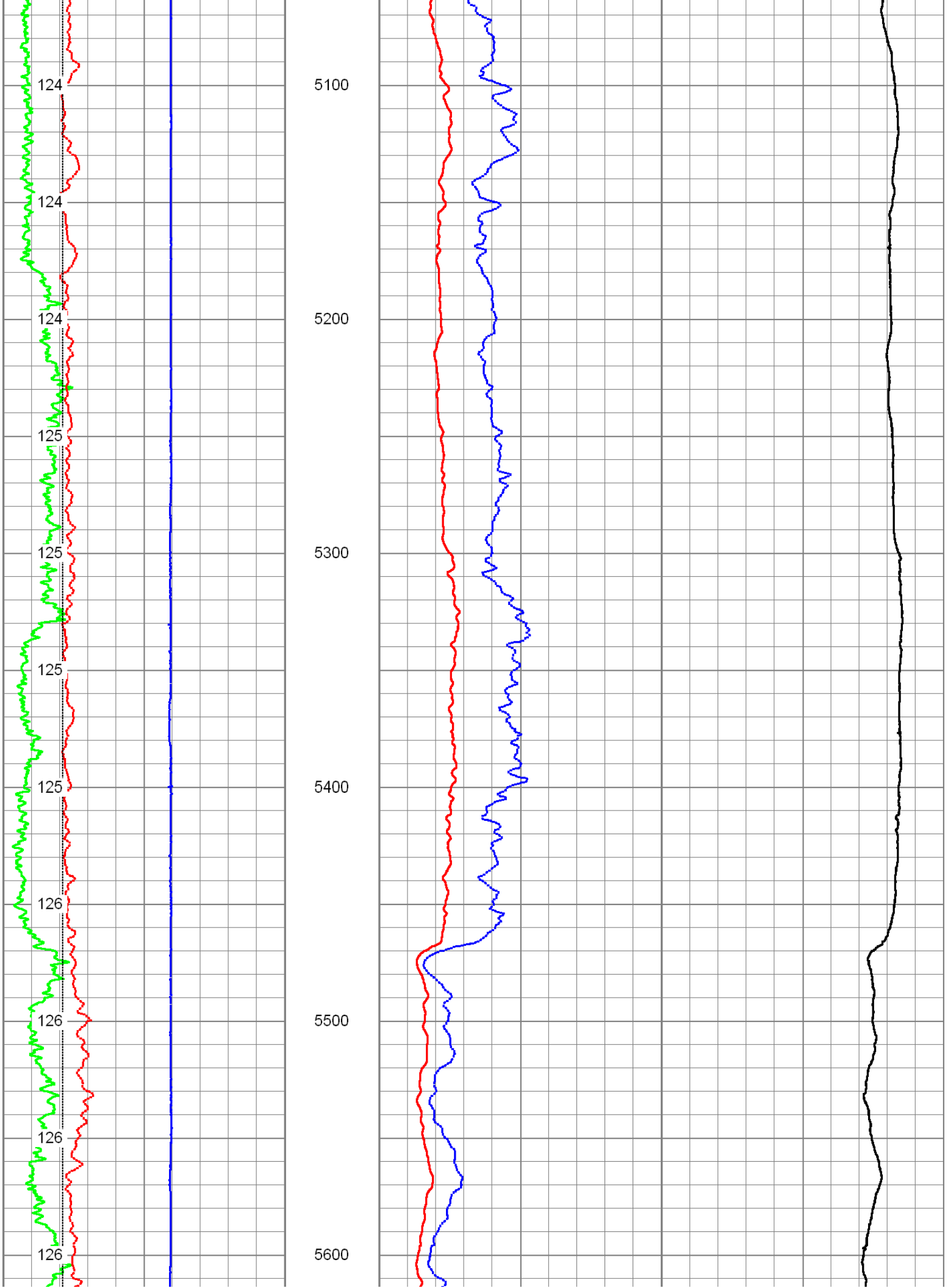
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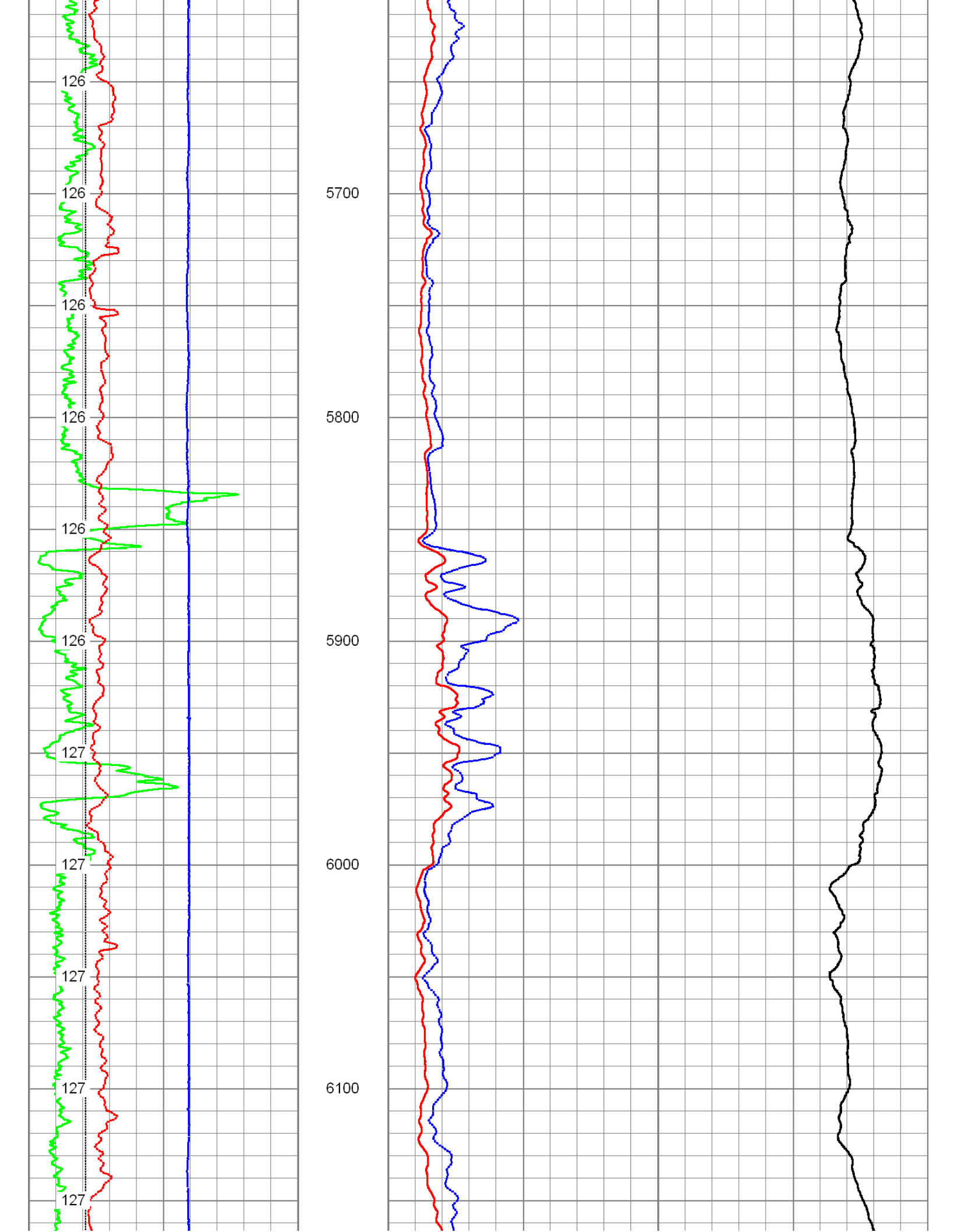
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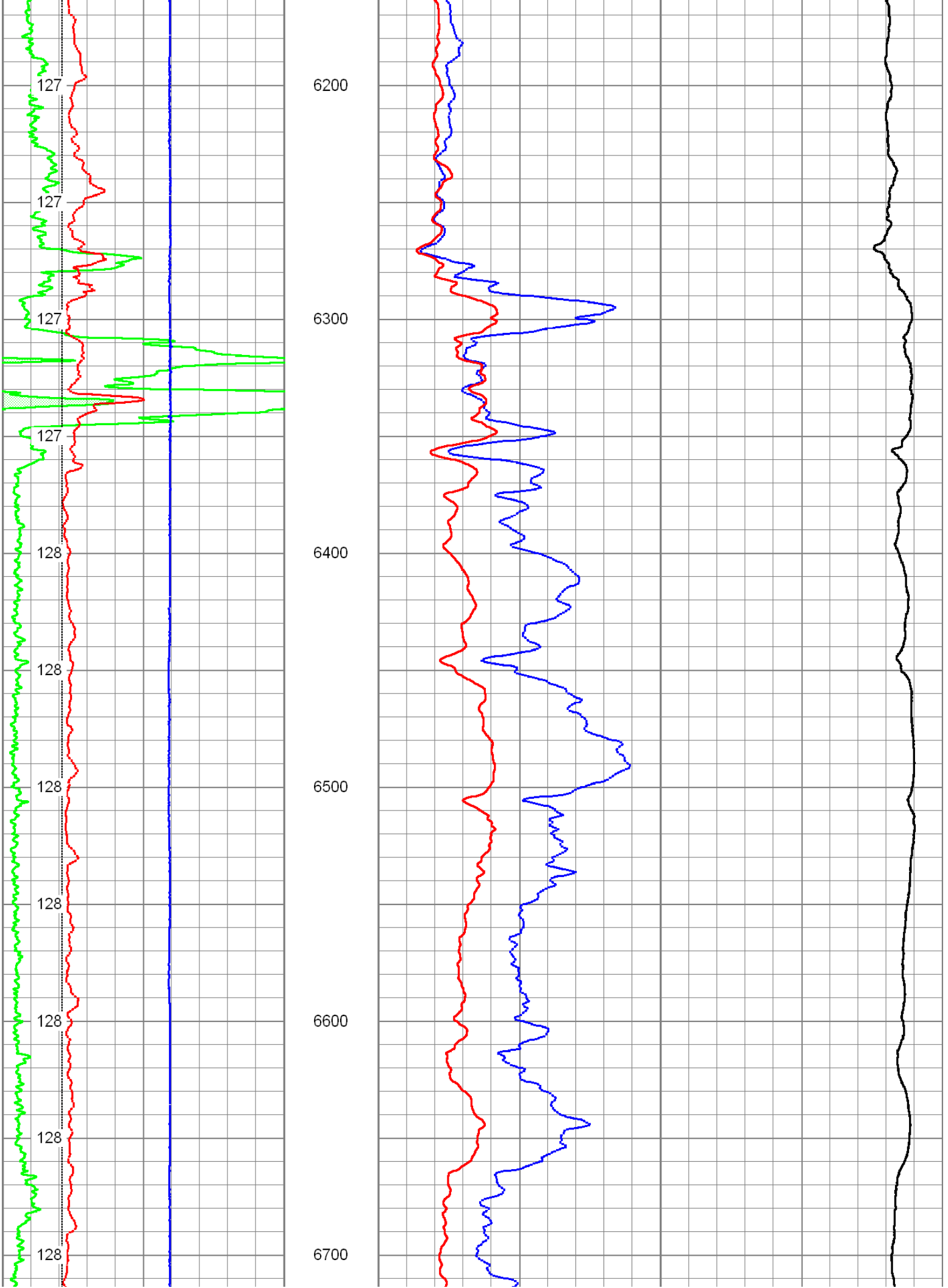
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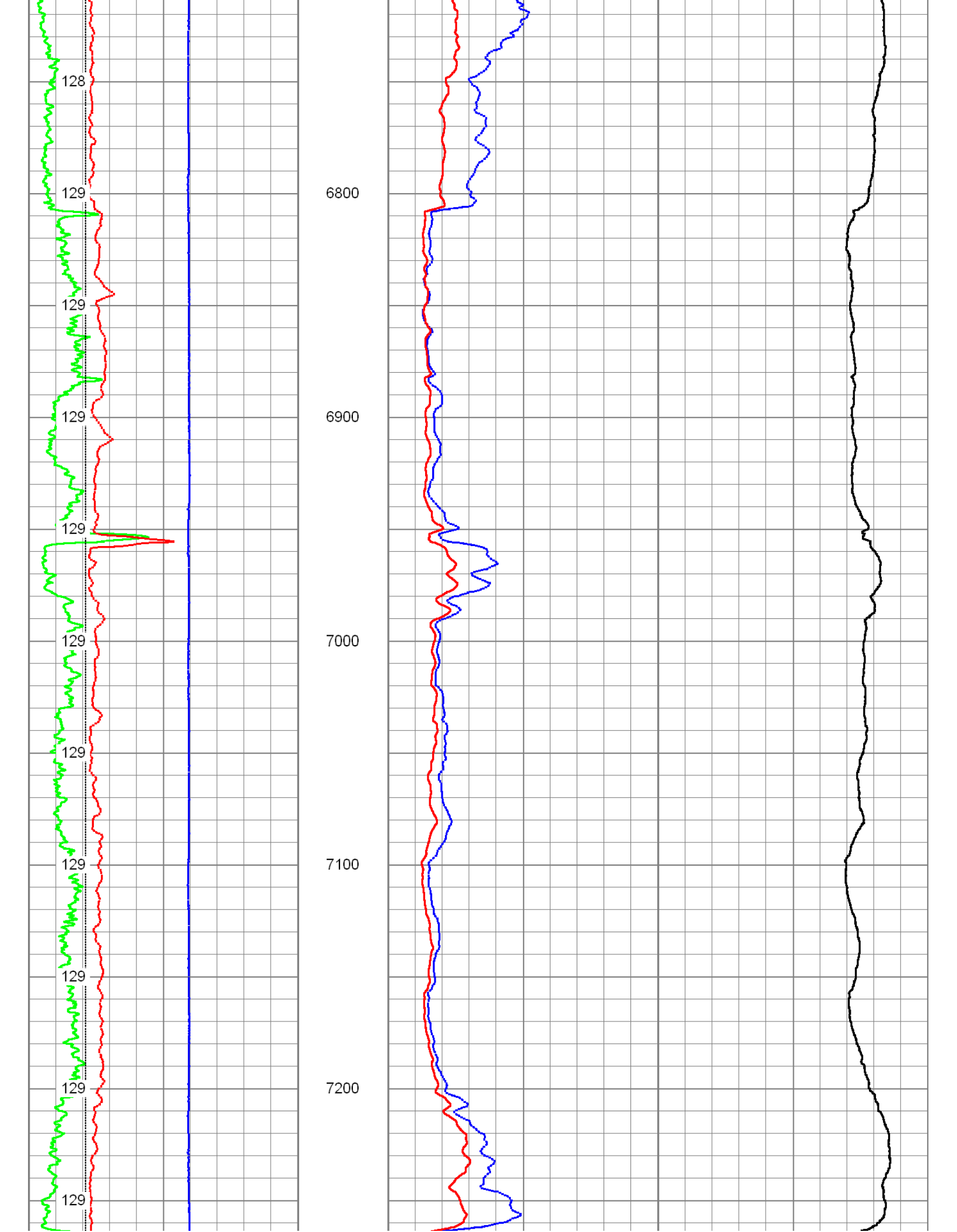
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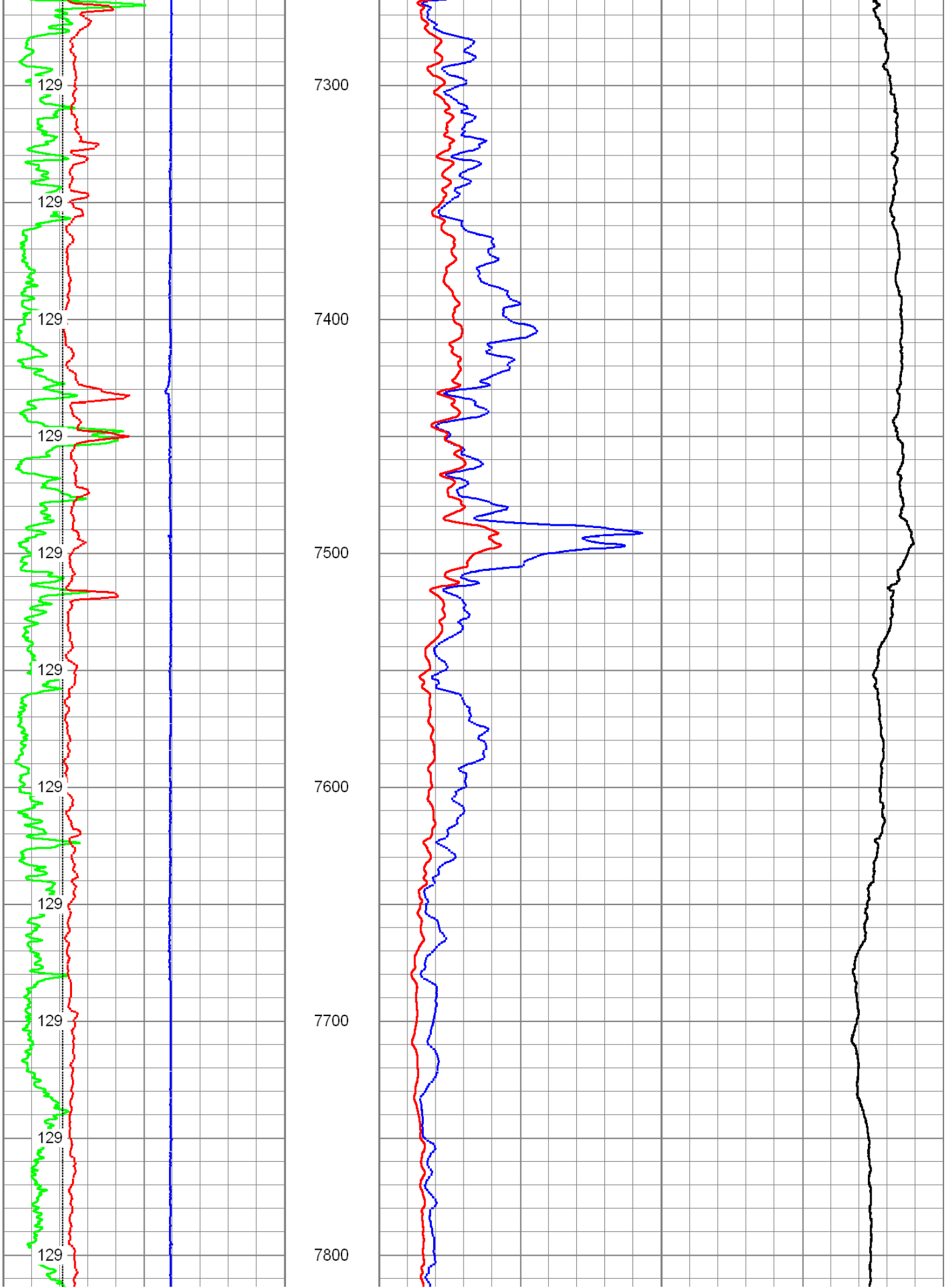
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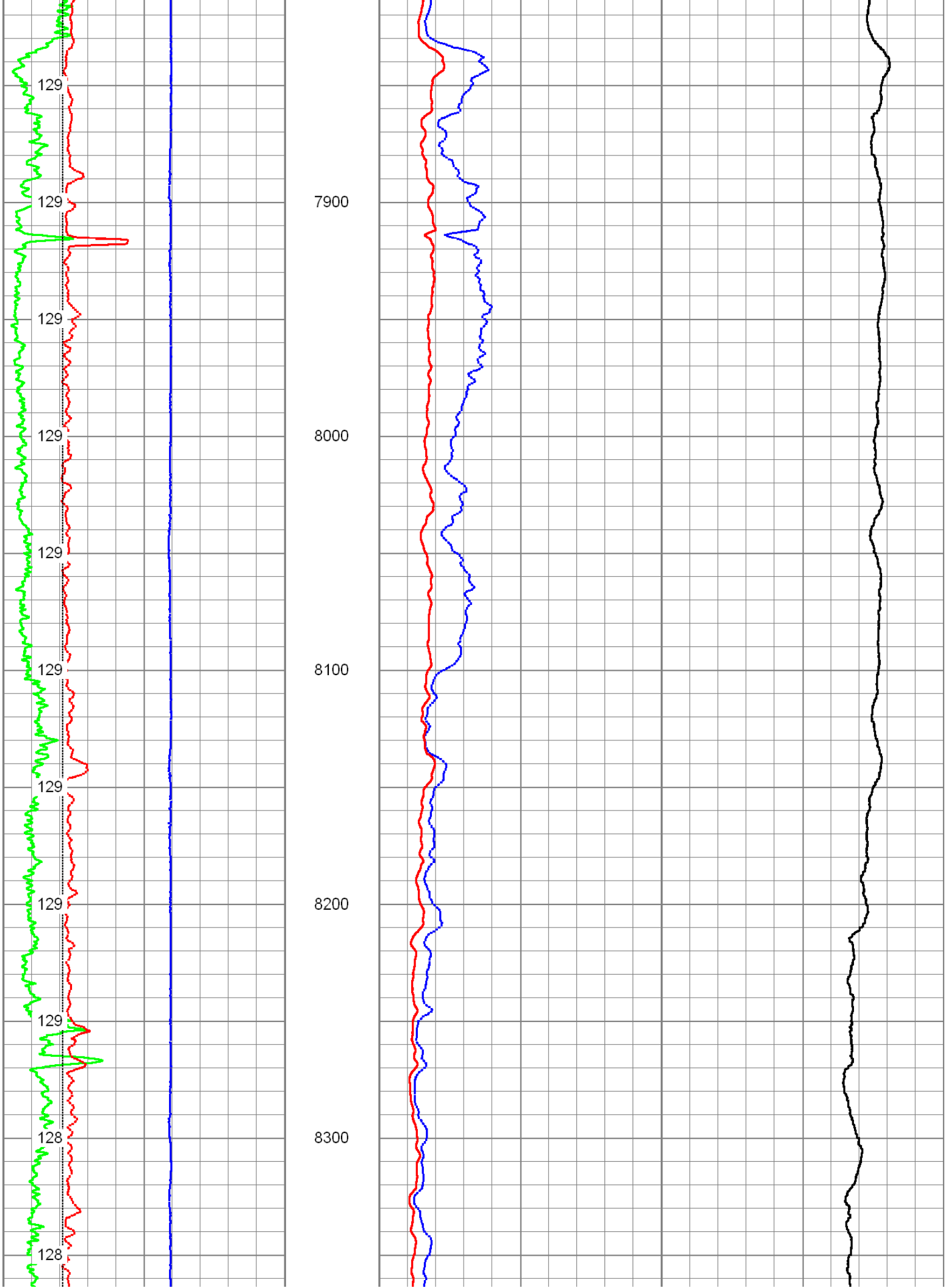
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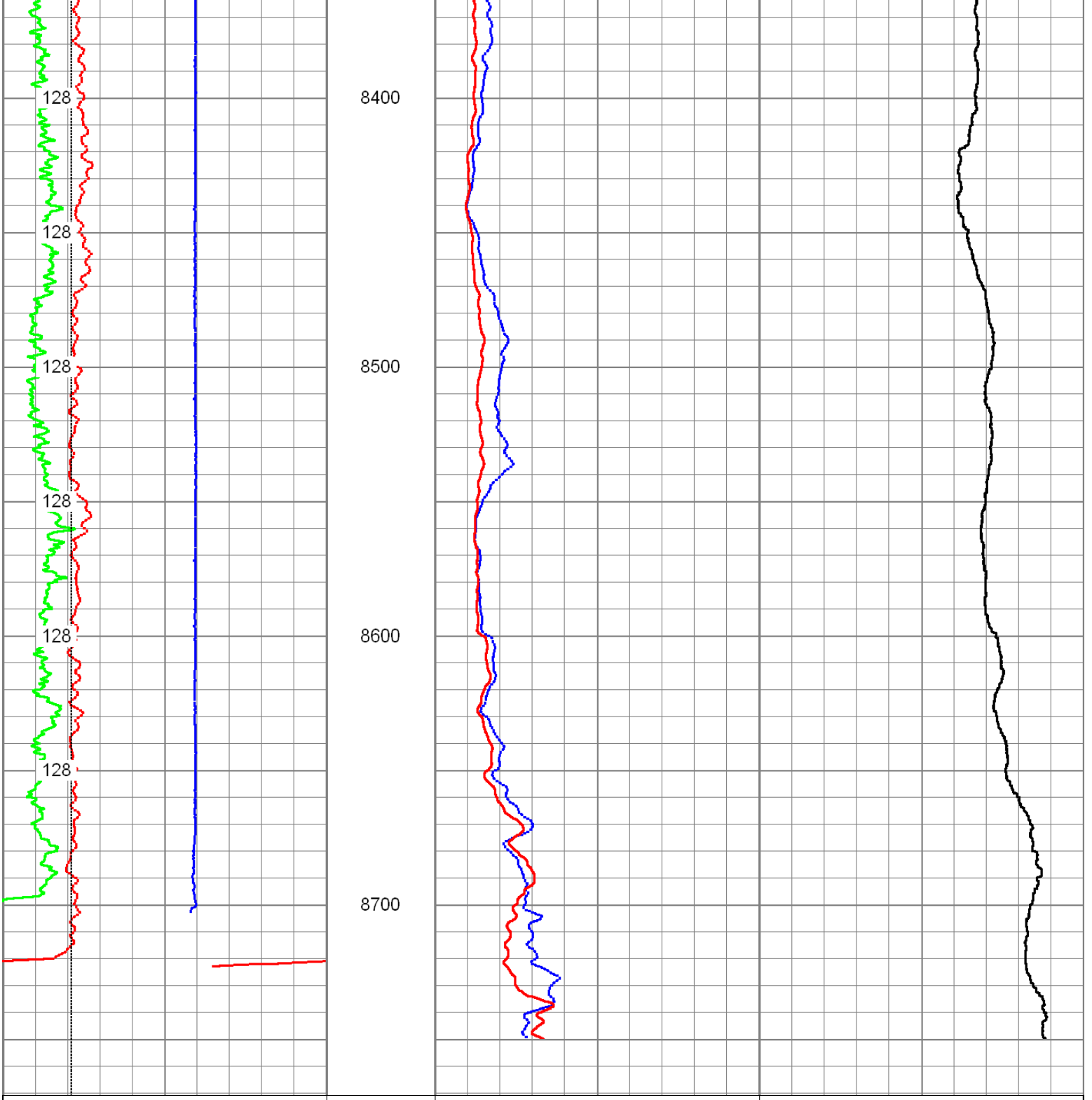

0	GR (GAPI)	150
4	DCAL (in)	14
-5	ACCY	5
4	BOREID (in)	14
GRTEMP (degF)		

50	20in 2ft Res (Ohm-m)	500
50	90in 2ft Res (Ohm-m)	500
1000	DEEP COND (mmho/m)	0
0	20in 2ft Res (Ohm-m)	50
0	90in 2ft Res (Ohm-m)	50

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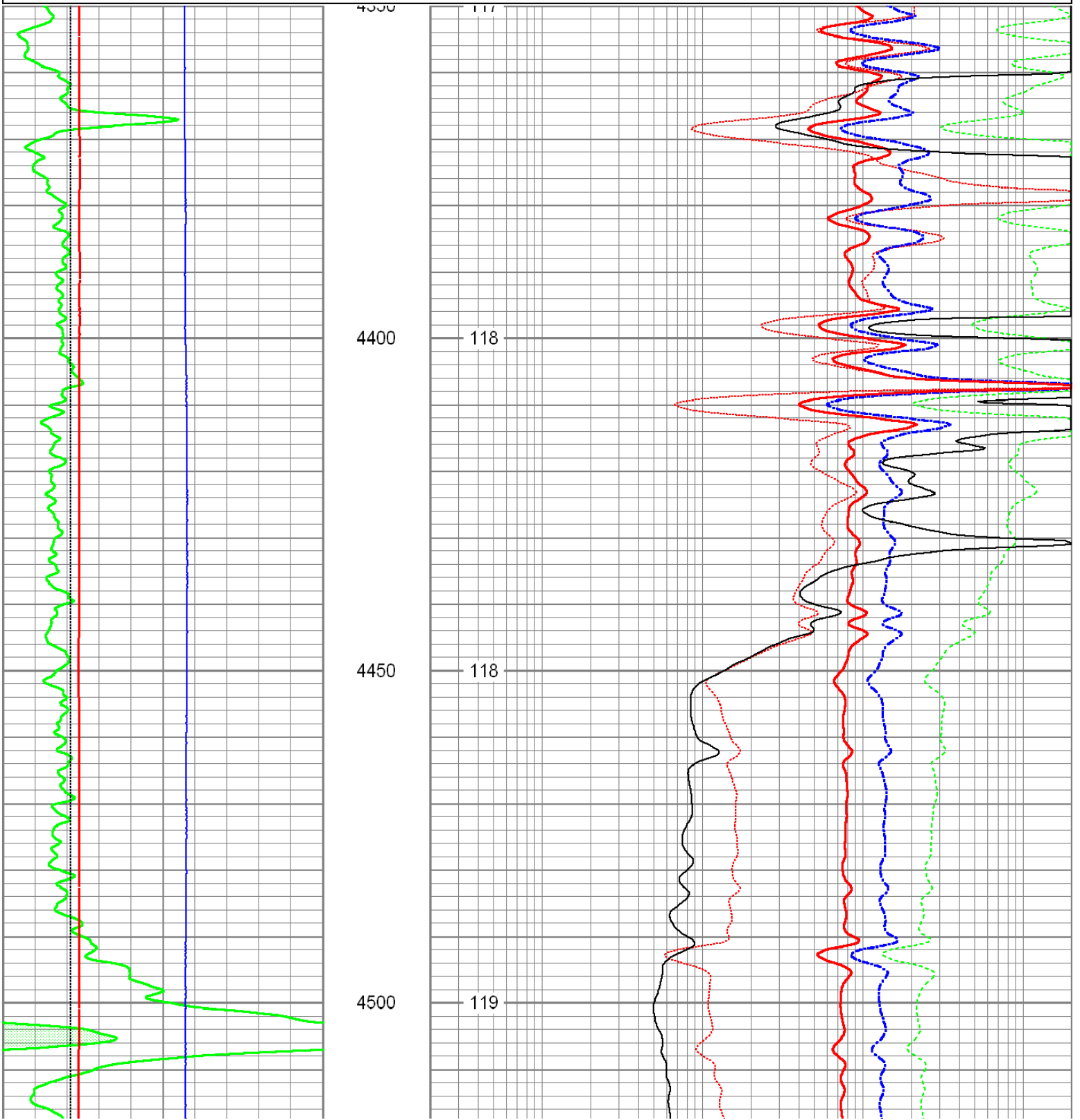
MAIN PASS

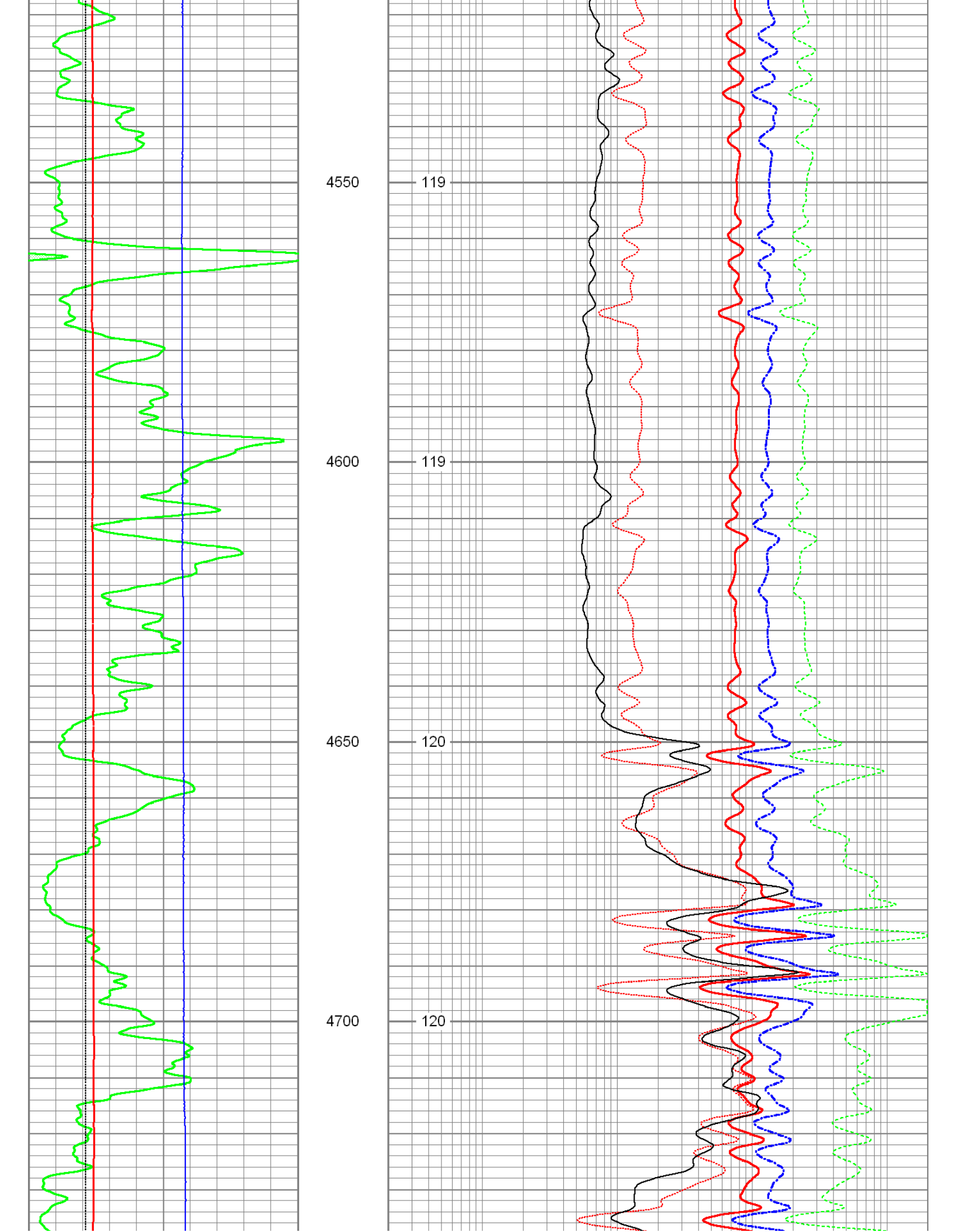
Database File:	kerr_mem.db
Dataset Pathname:	proc1/pass1.2
Presentation Format:	6_5r_chk
Dataset Creation:	Wed Sep 19 11:30:58 2012
Charted by:	Depth in Feet scaled 1:240

0	GR (GAPI)	150
4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

0.2	20inRadial (Ohm-m)	2000
0.2	30inRadial (Ohm-m)	2000
0.2	60inRadial (Ohm-m)	2000
0.2	90inRadial (Ohm-m)	2000
0.2	10inRadial (Ohm-m)	2000

GRTEMP (degF)

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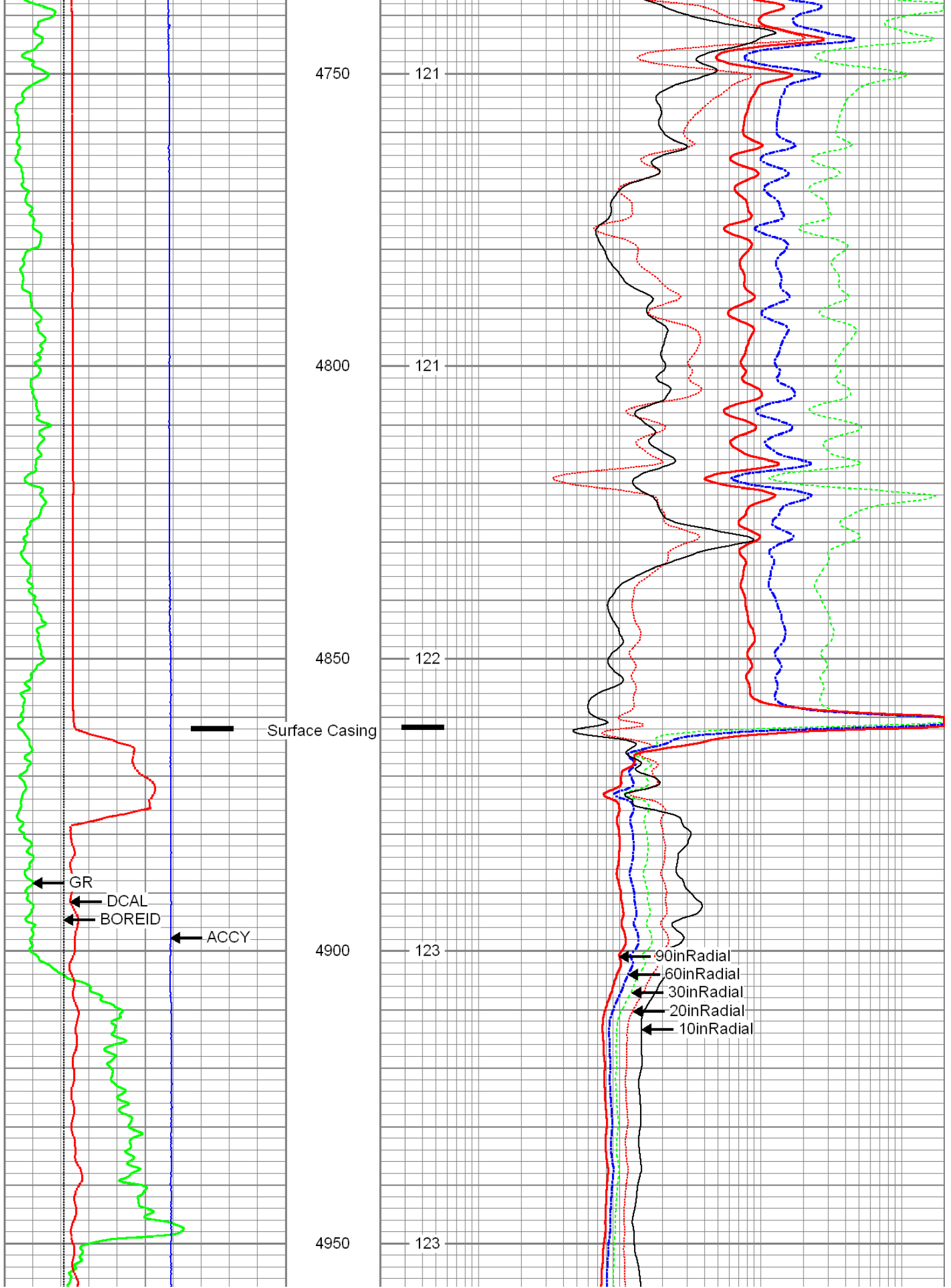
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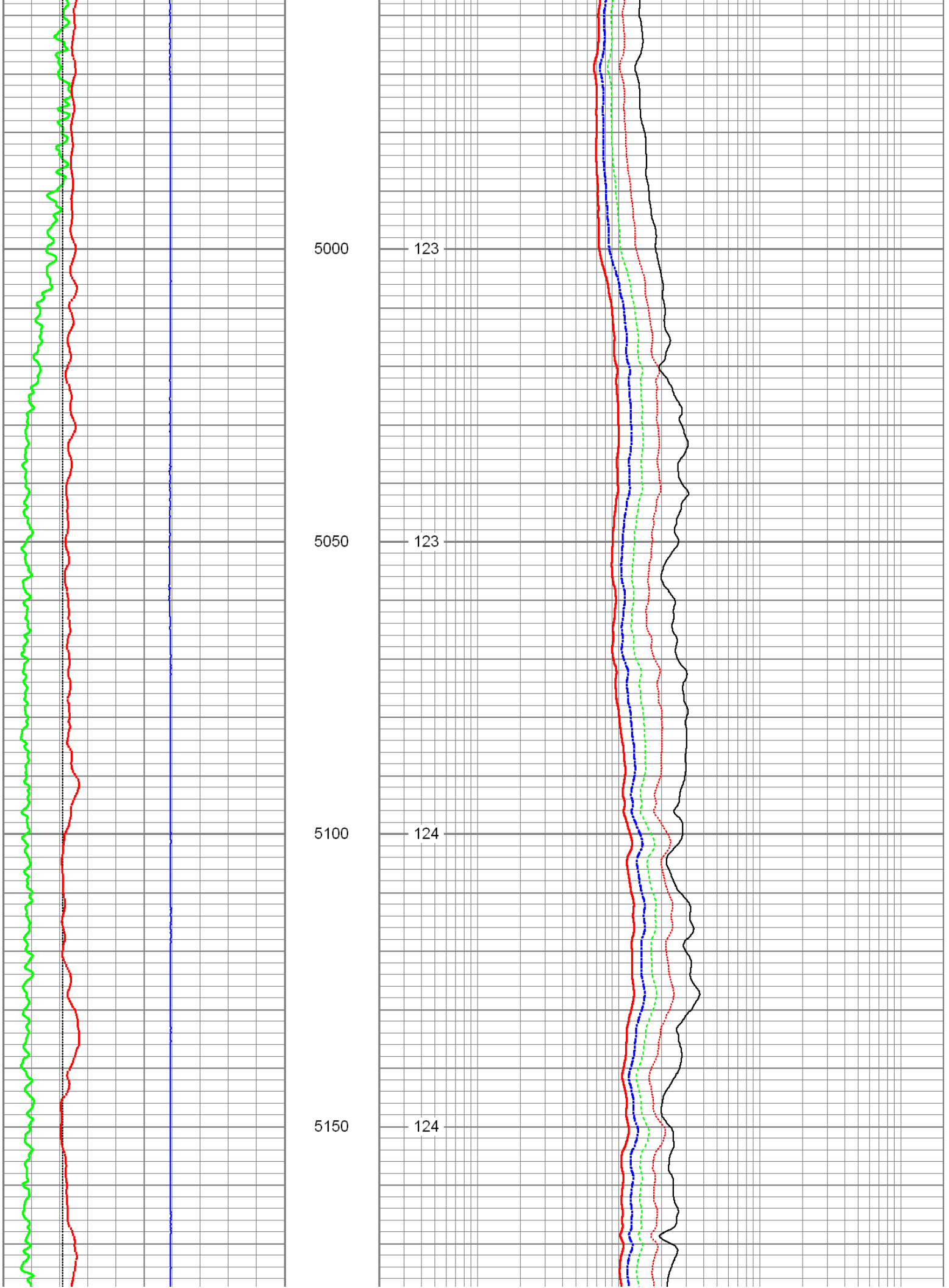
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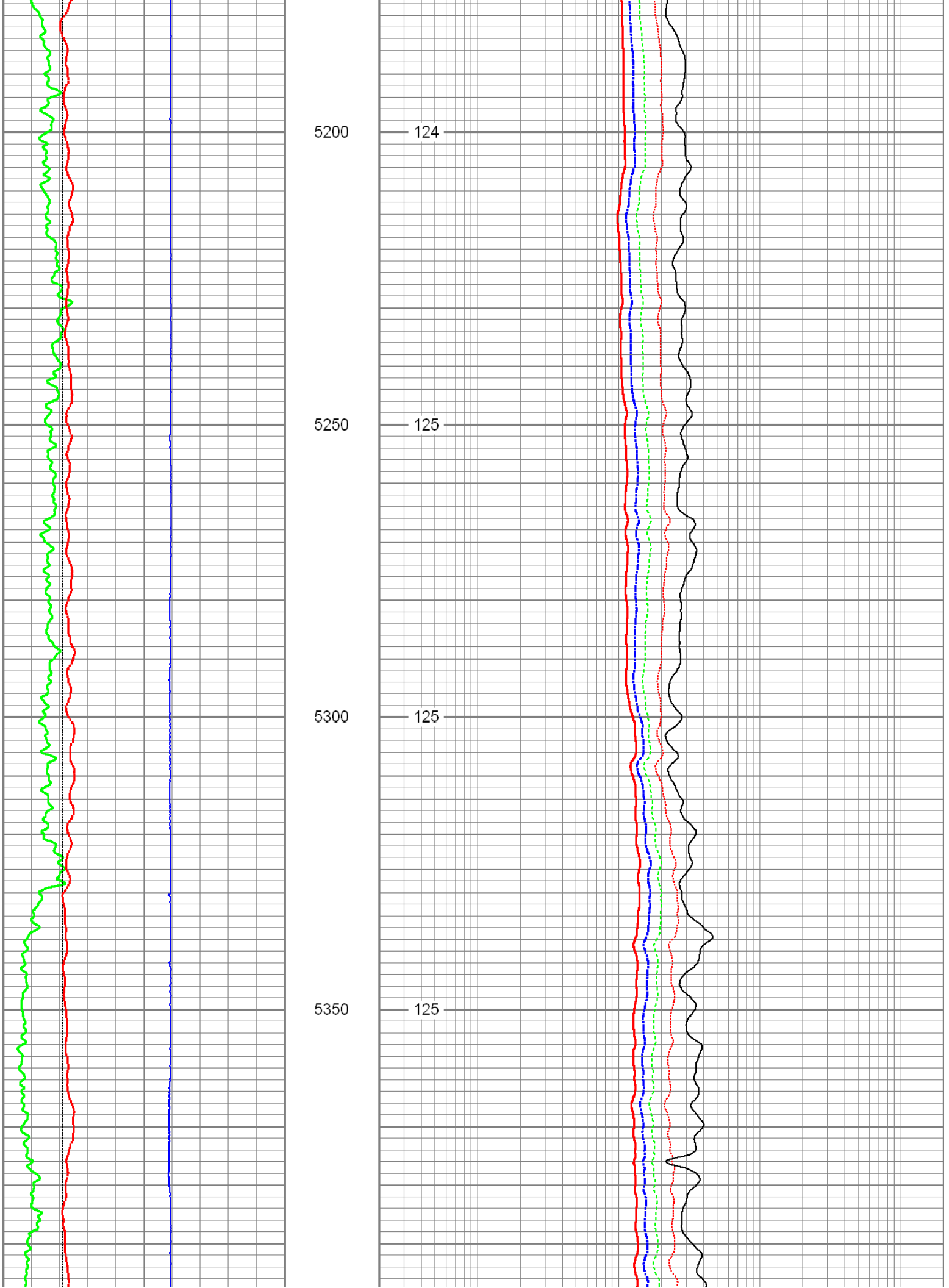
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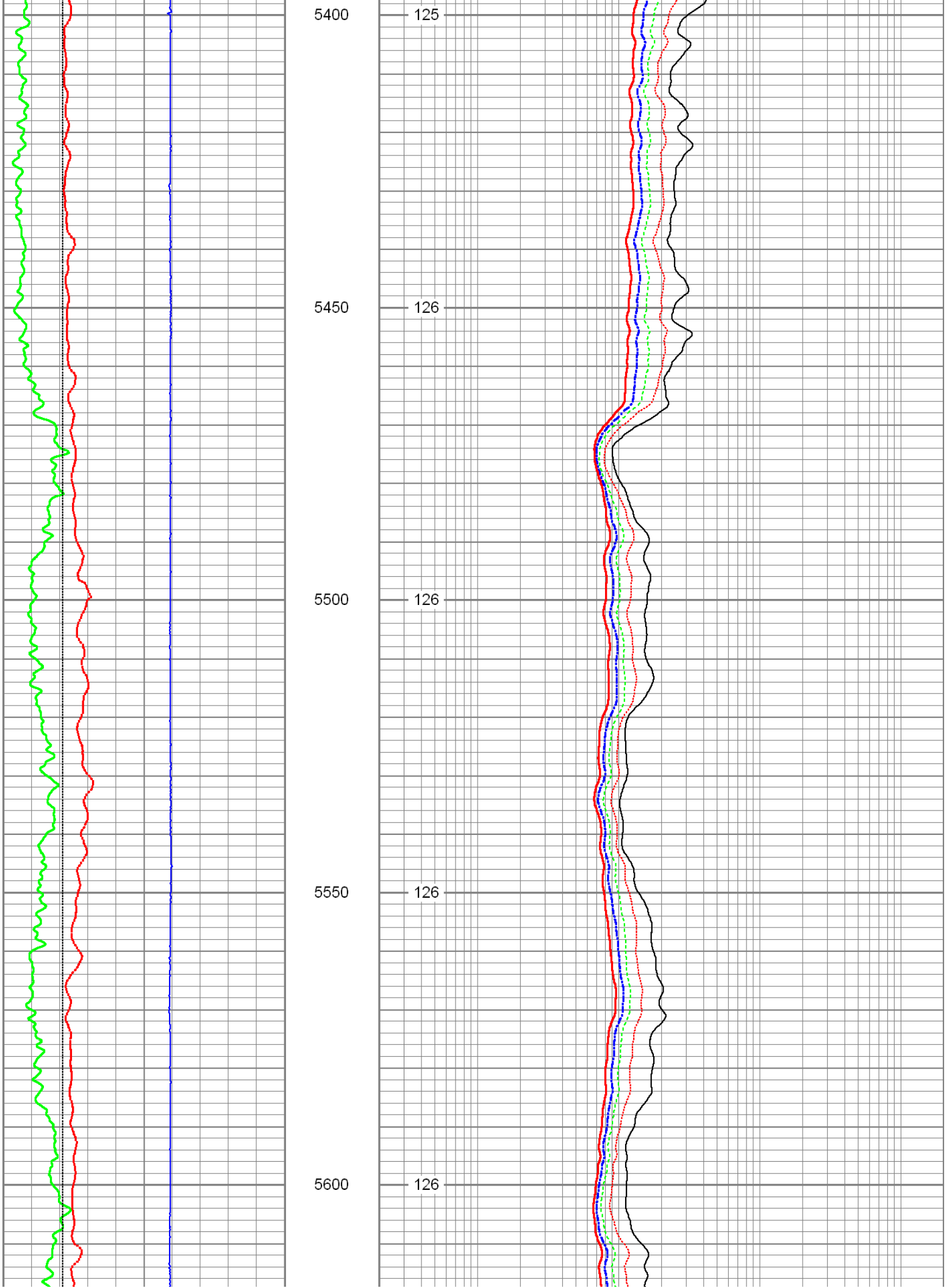
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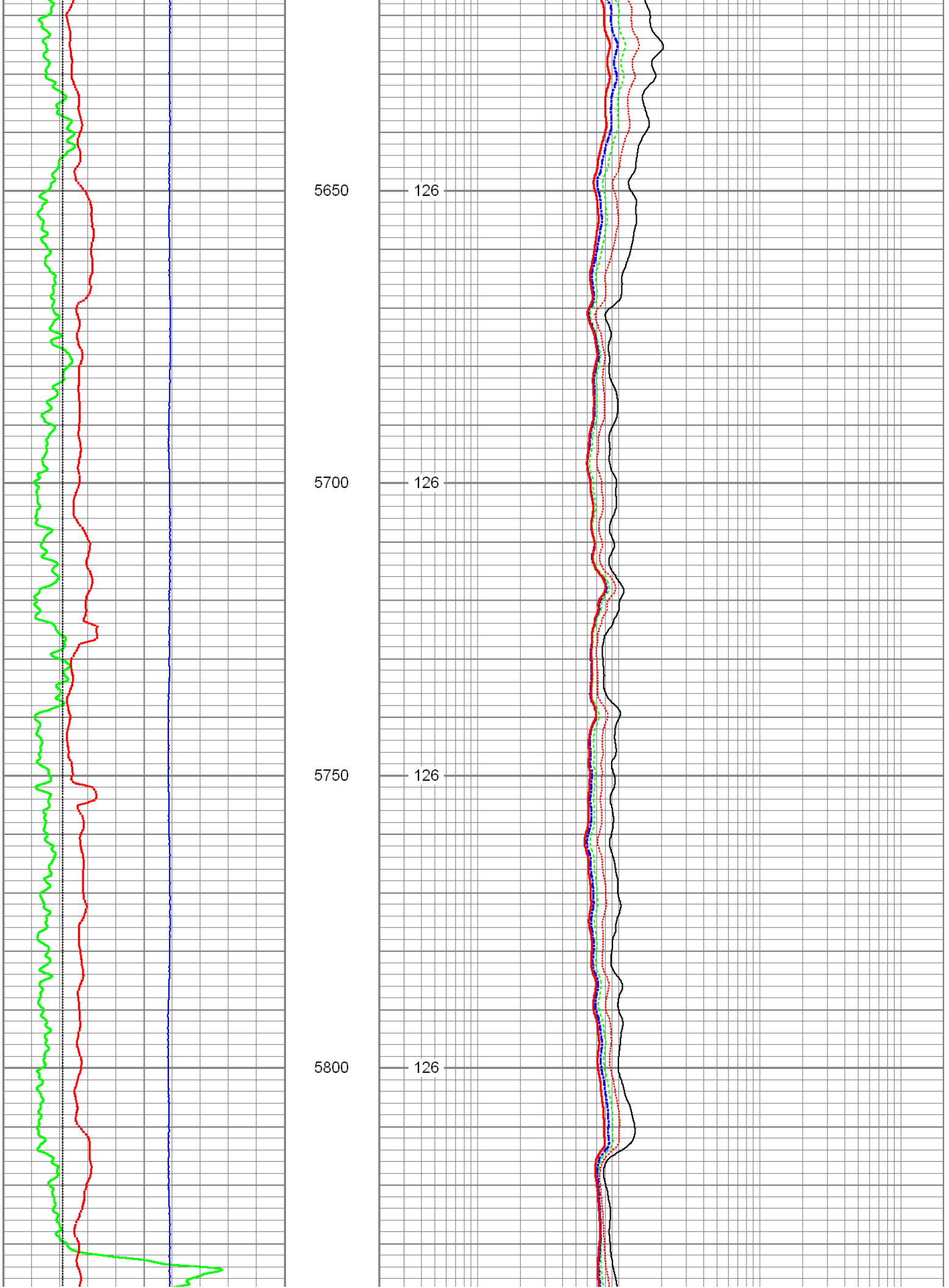
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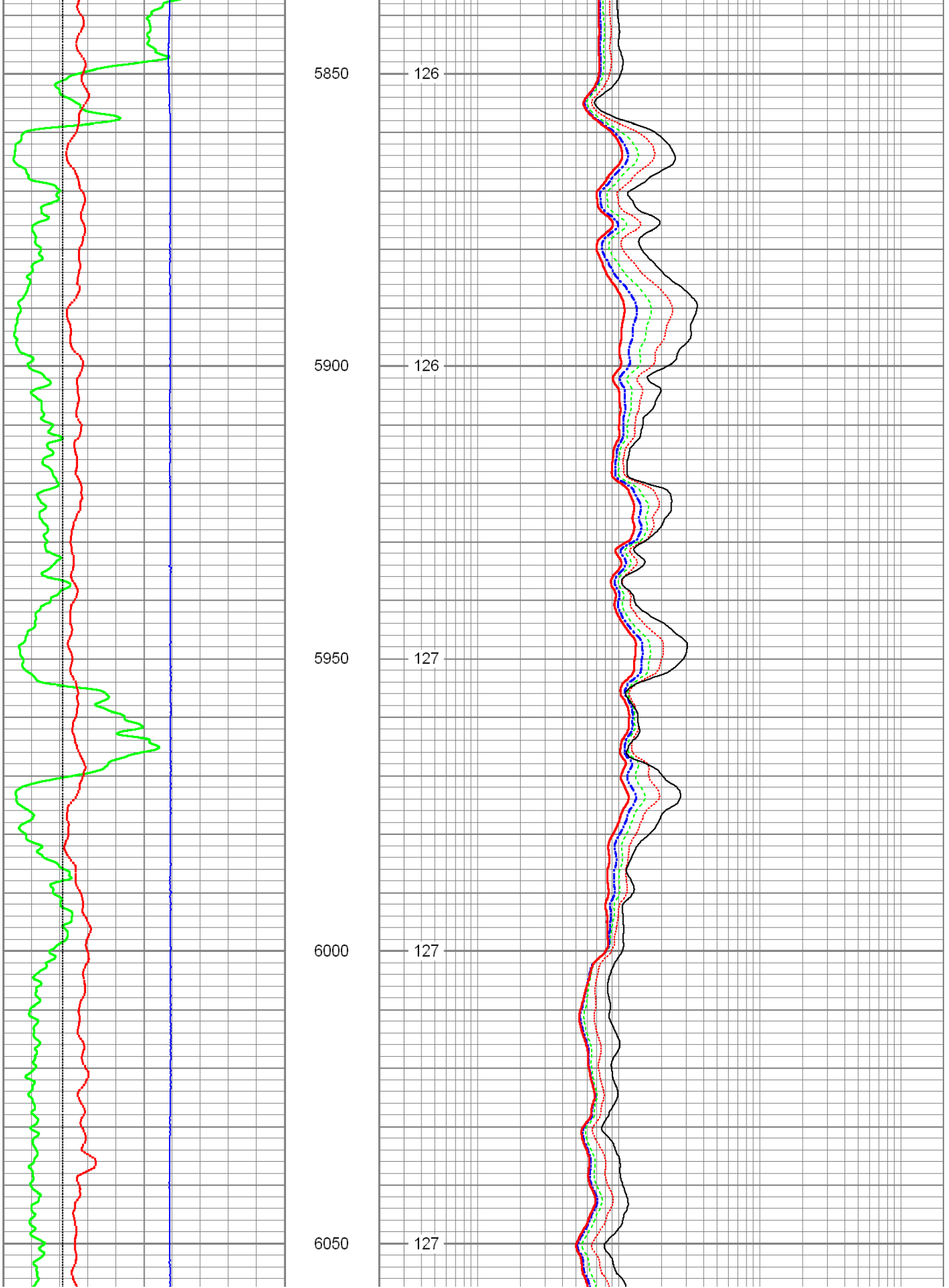
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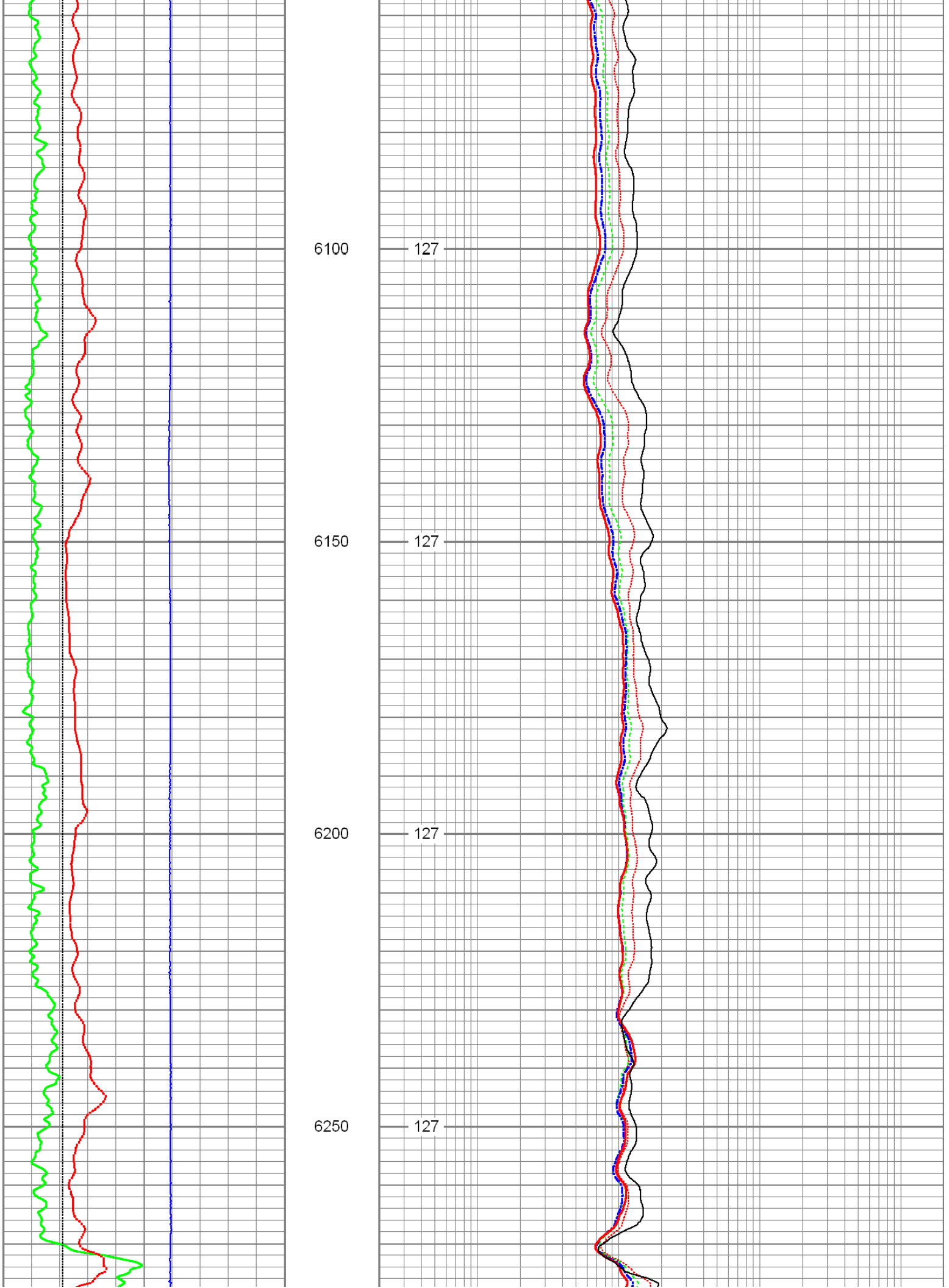
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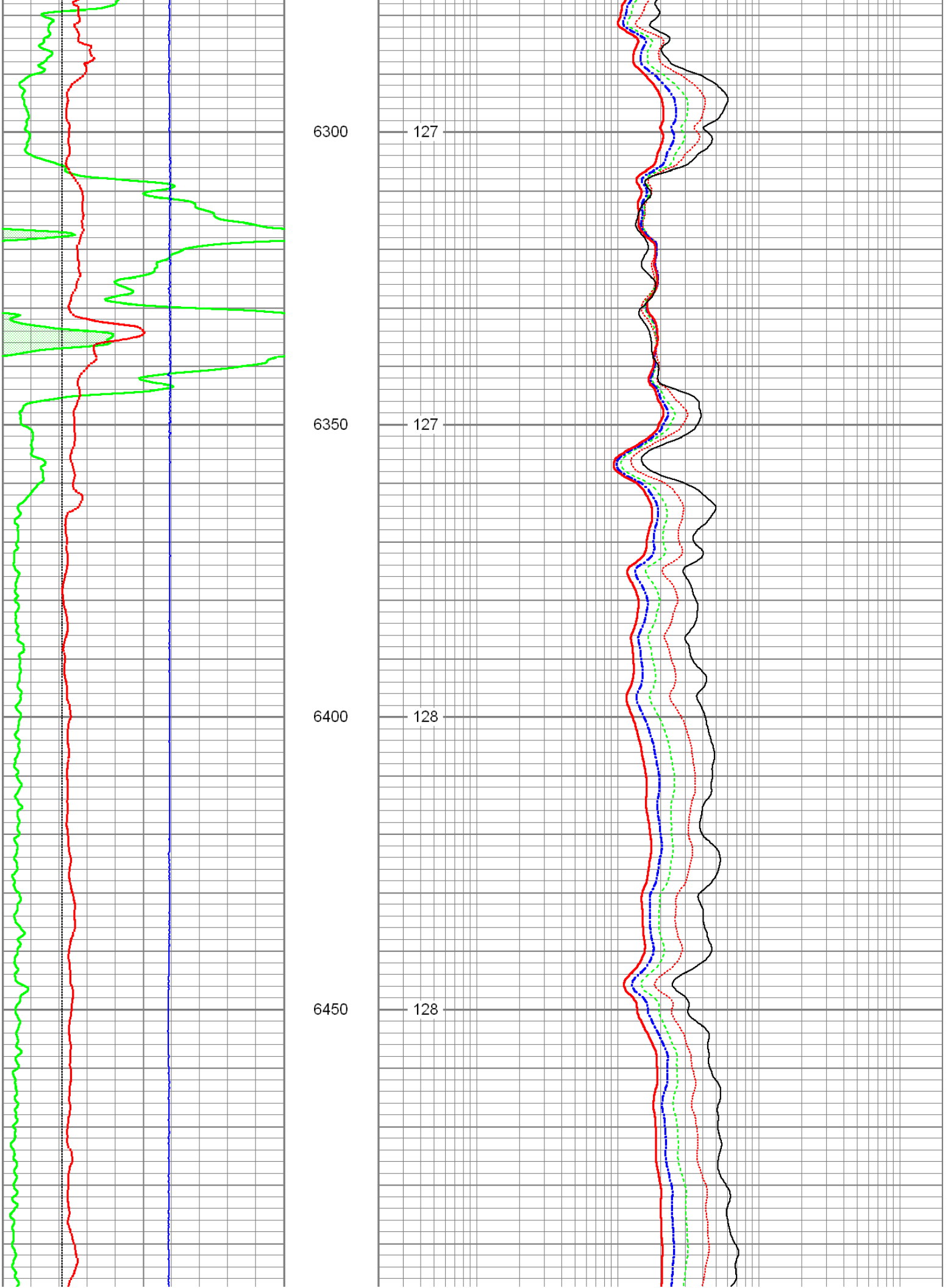
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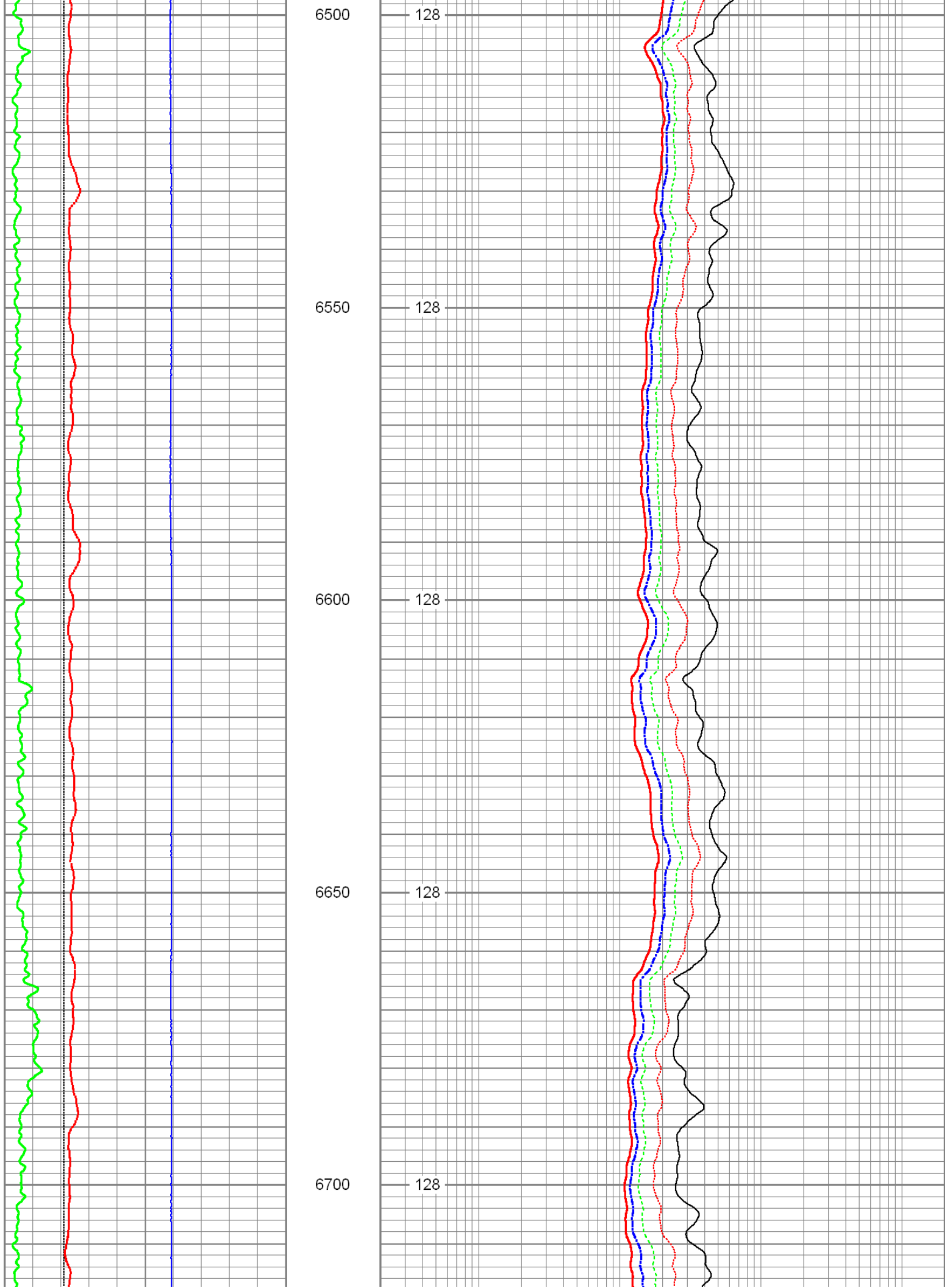
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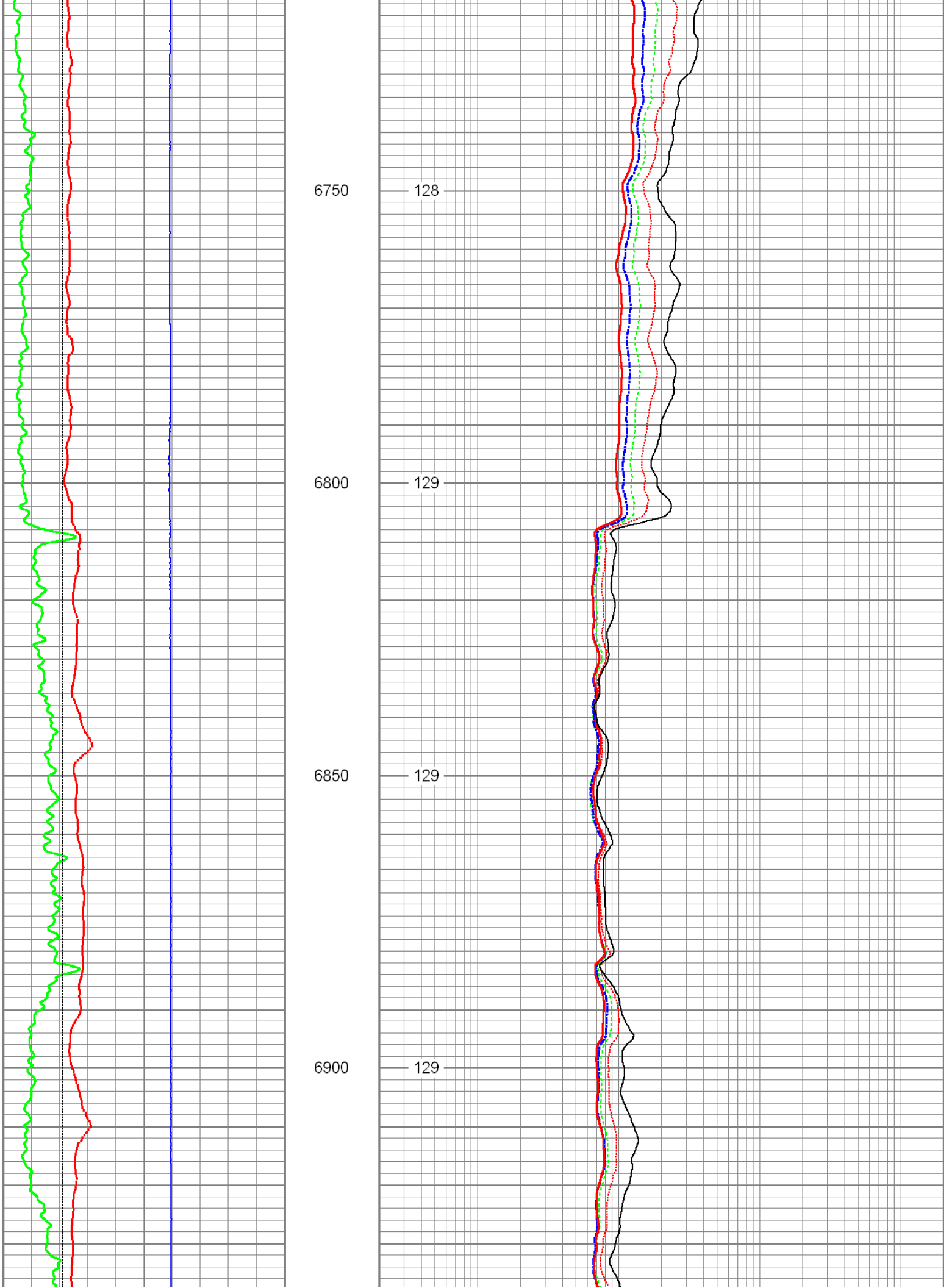
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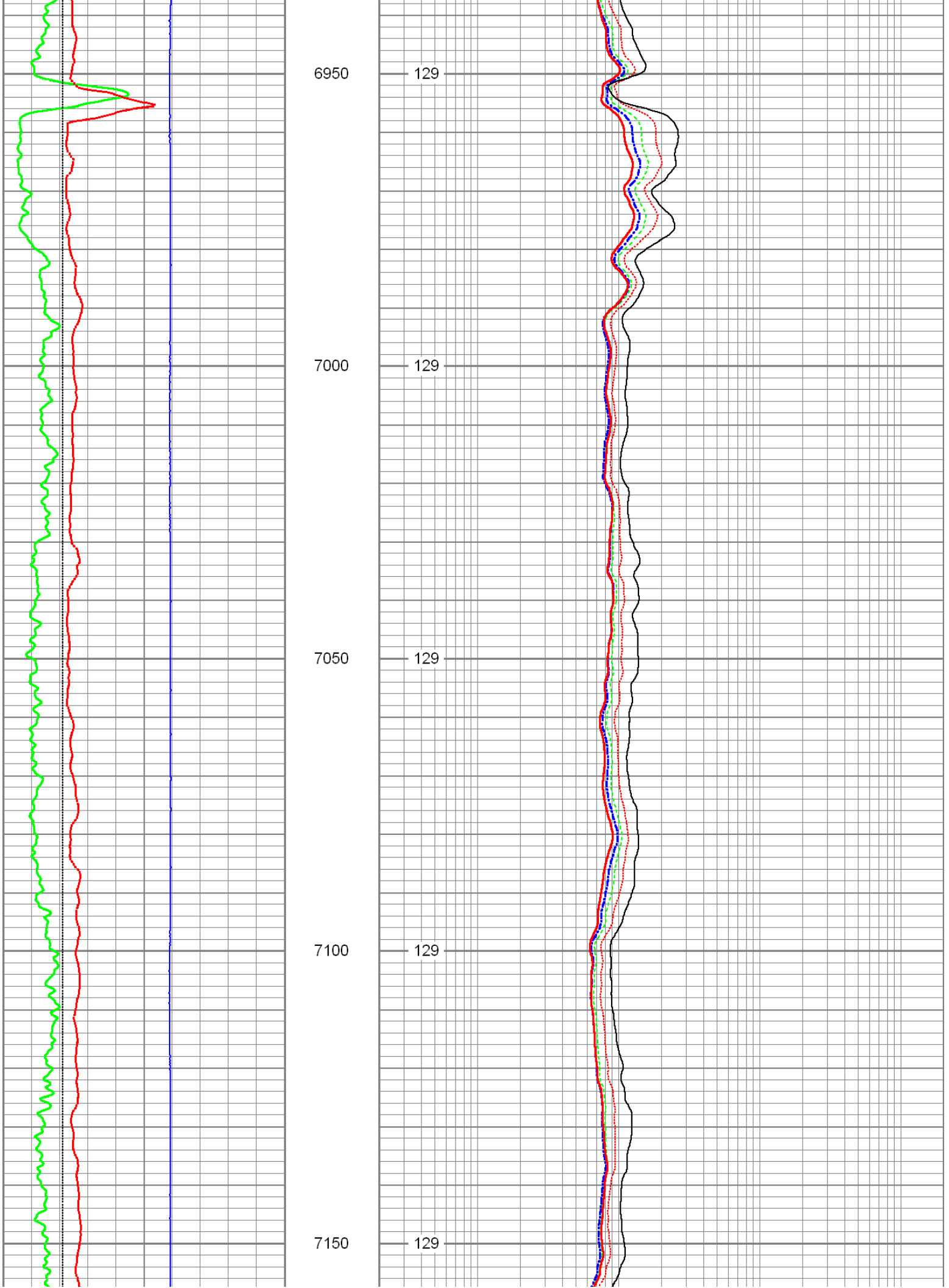
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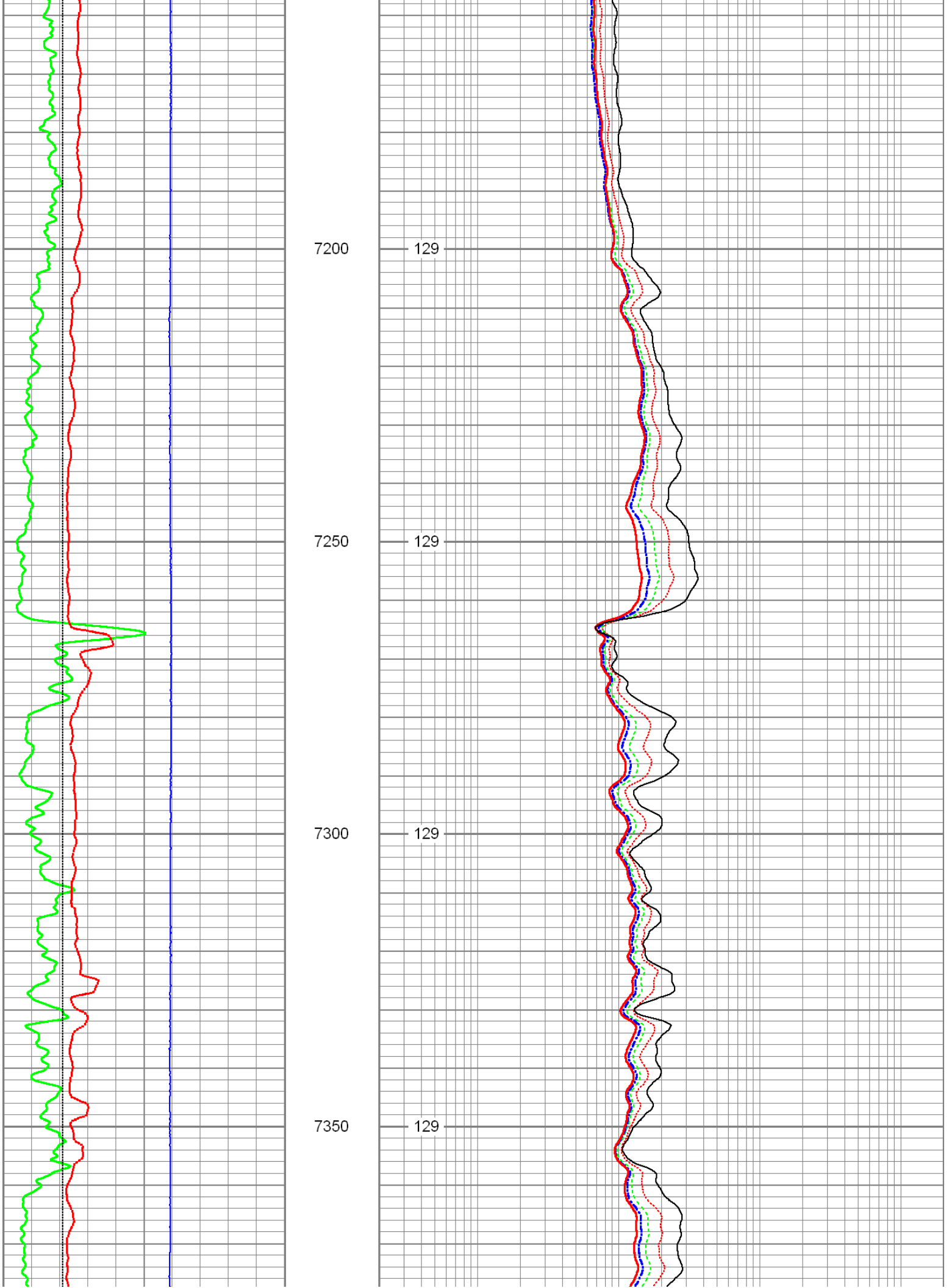
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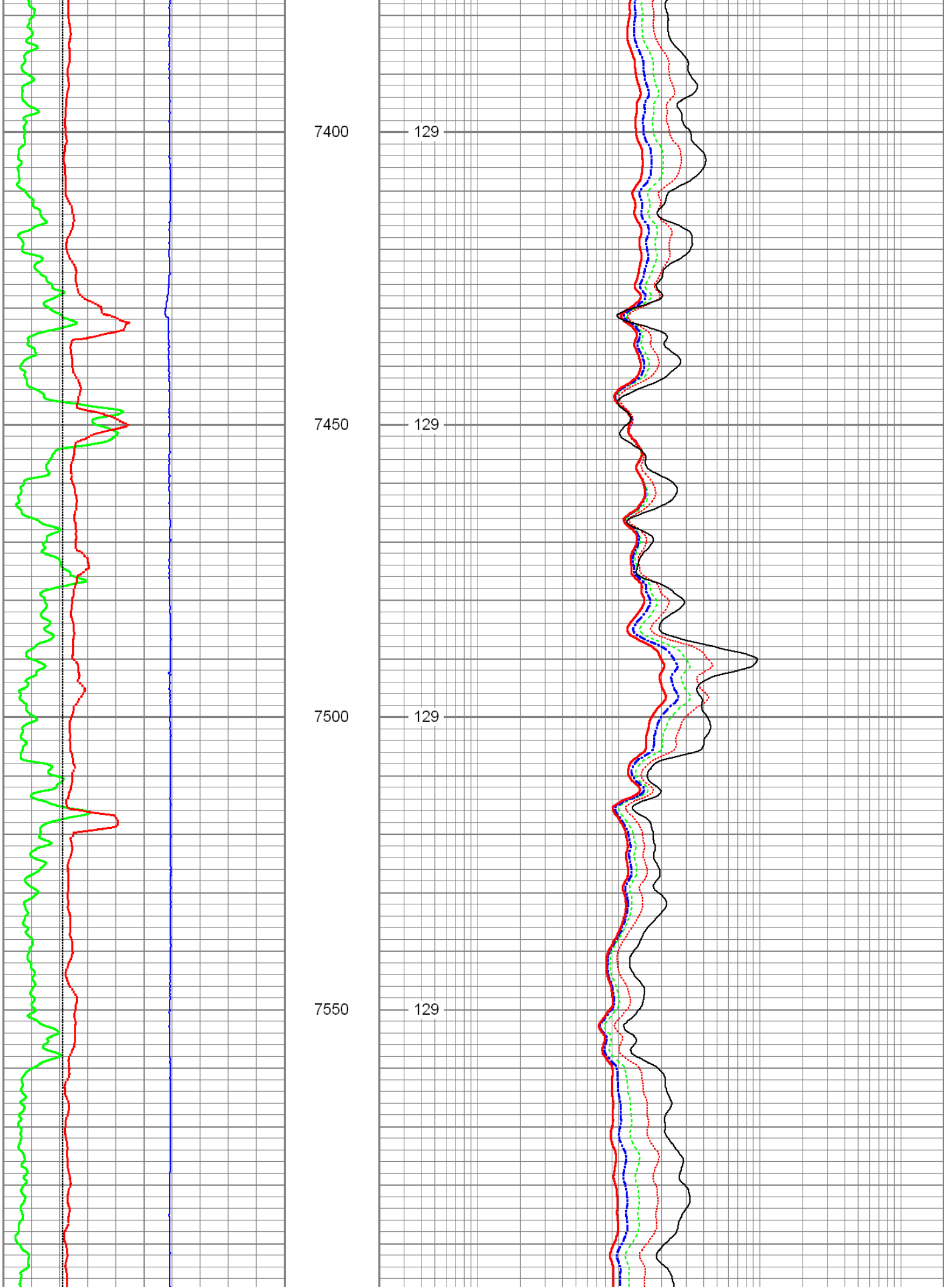
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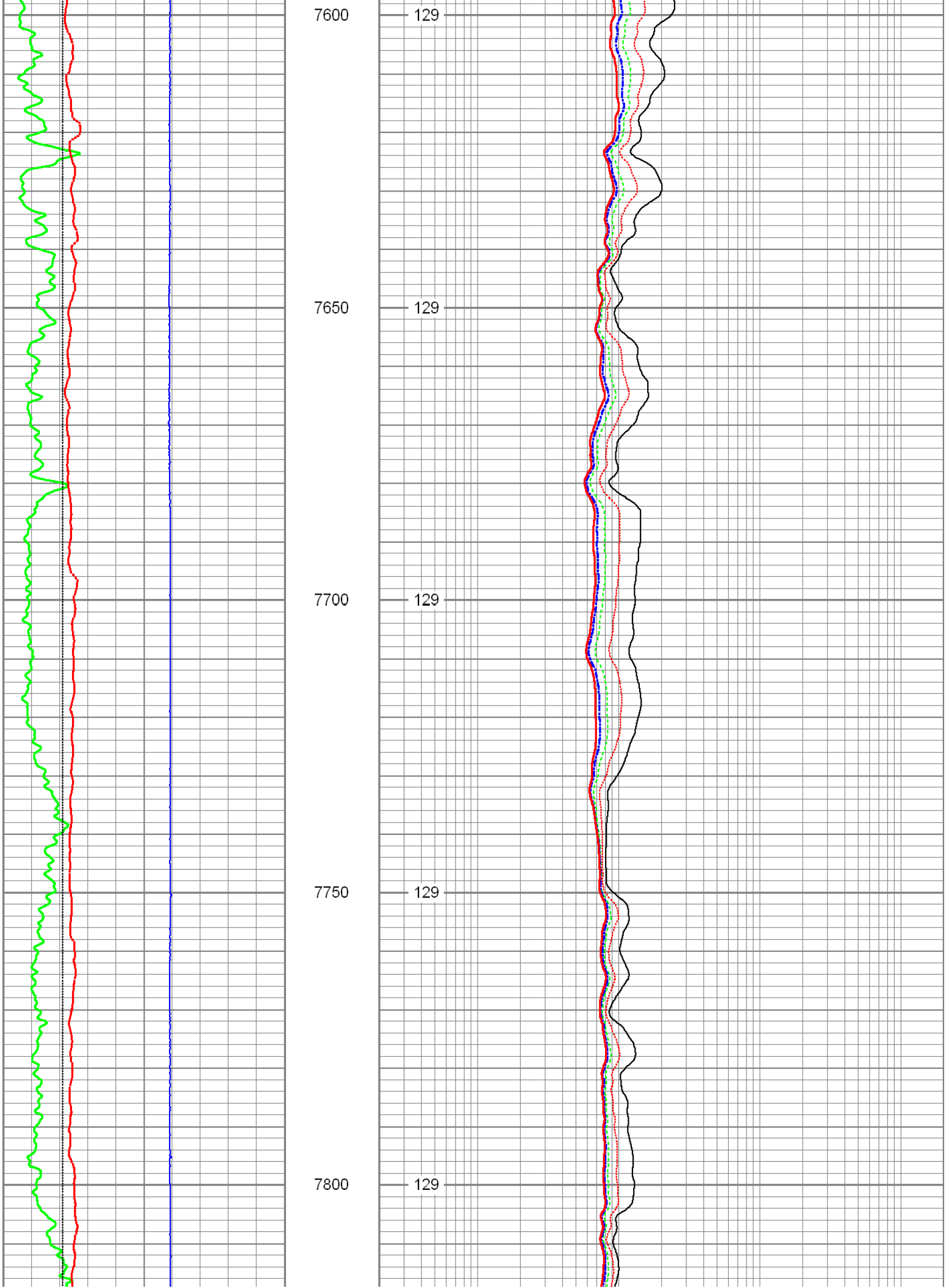
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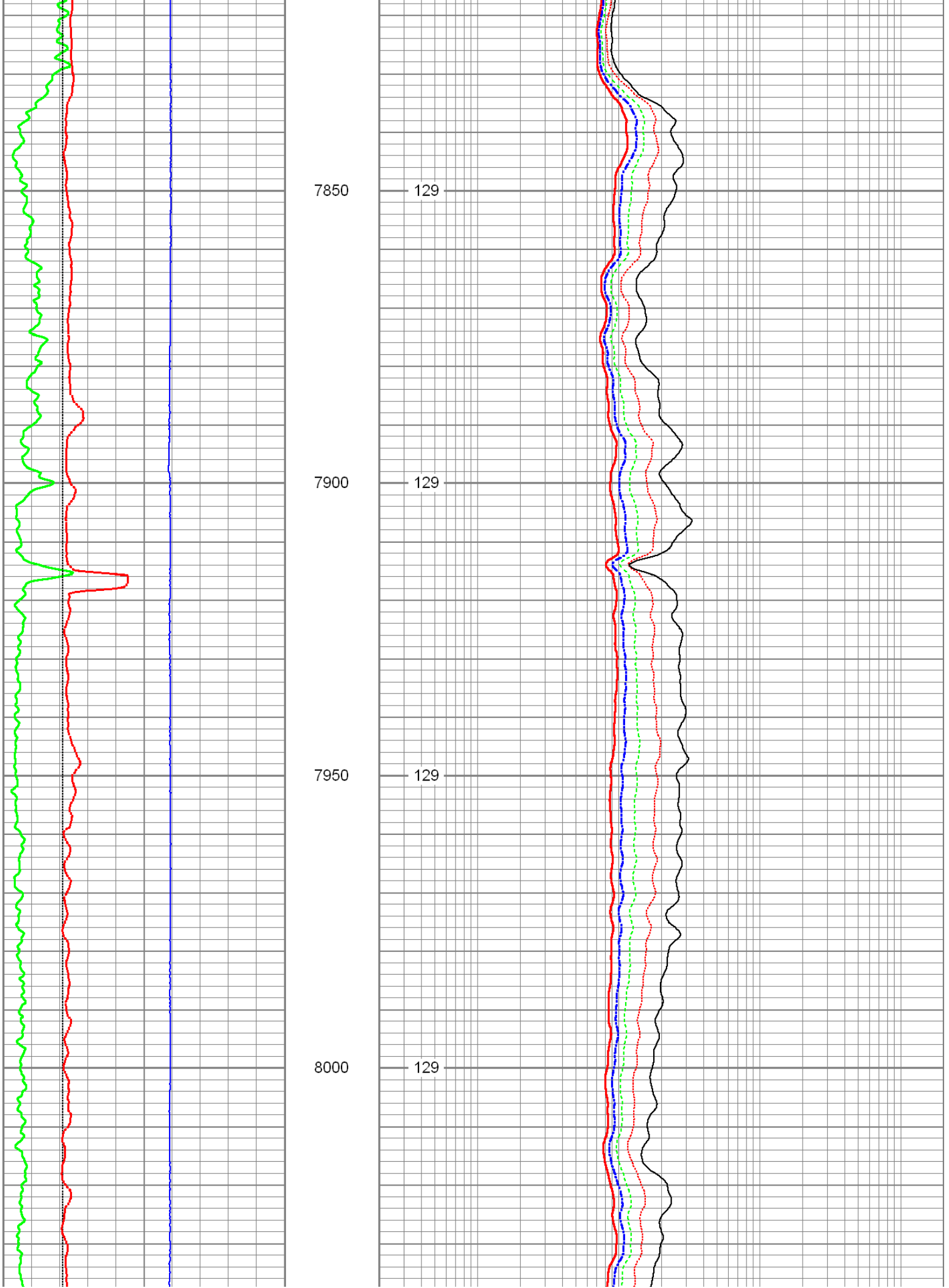
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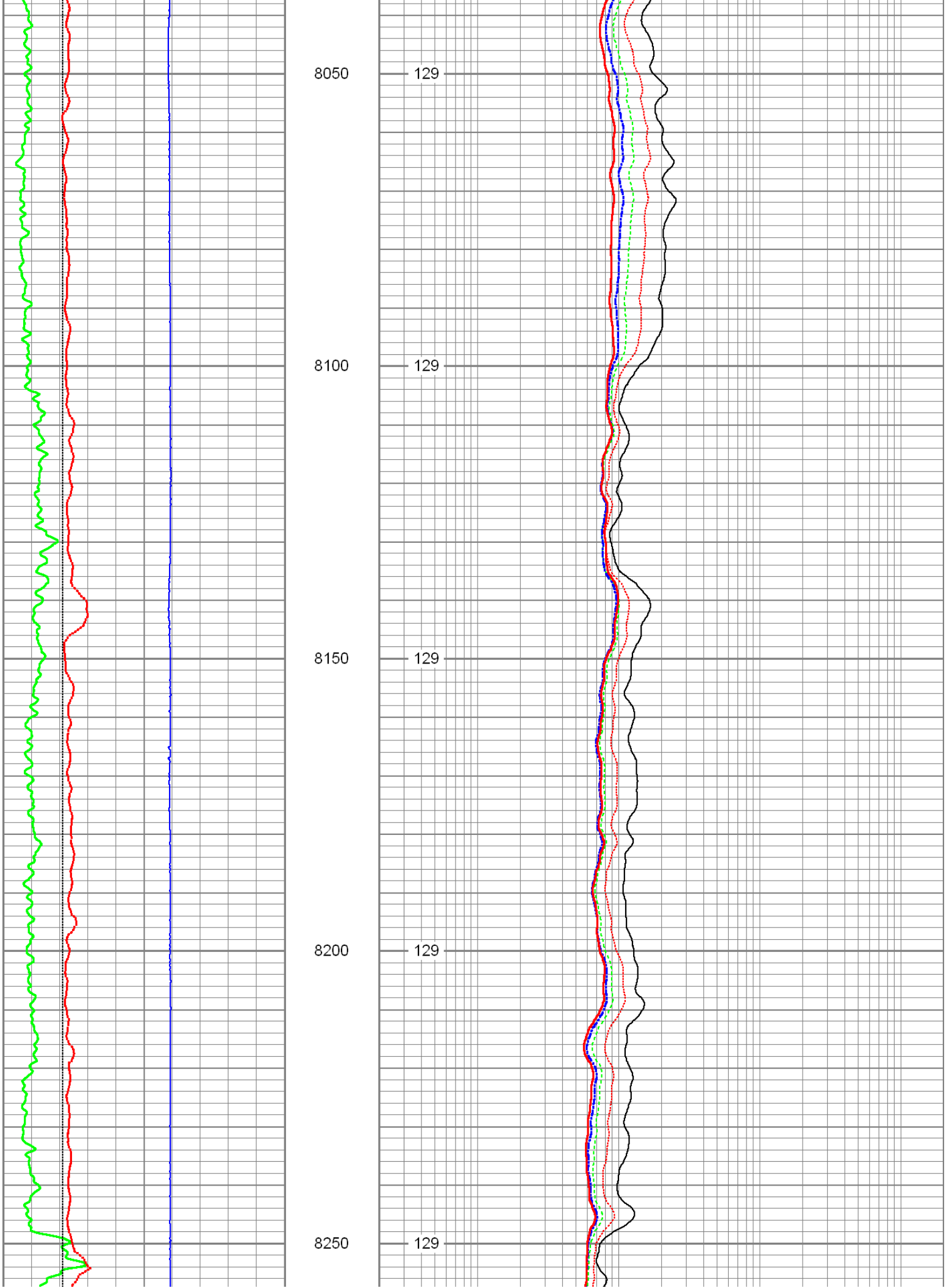
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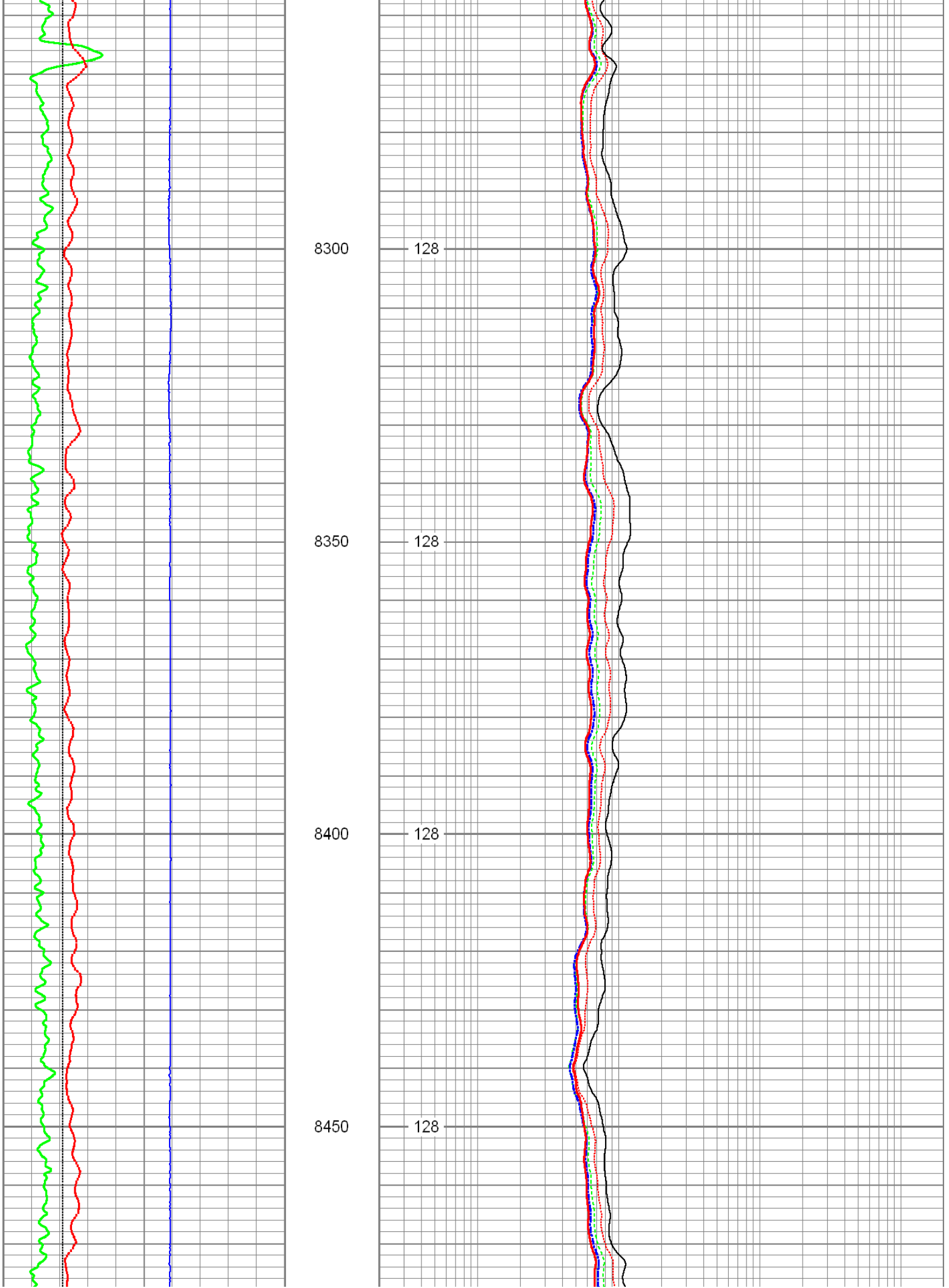
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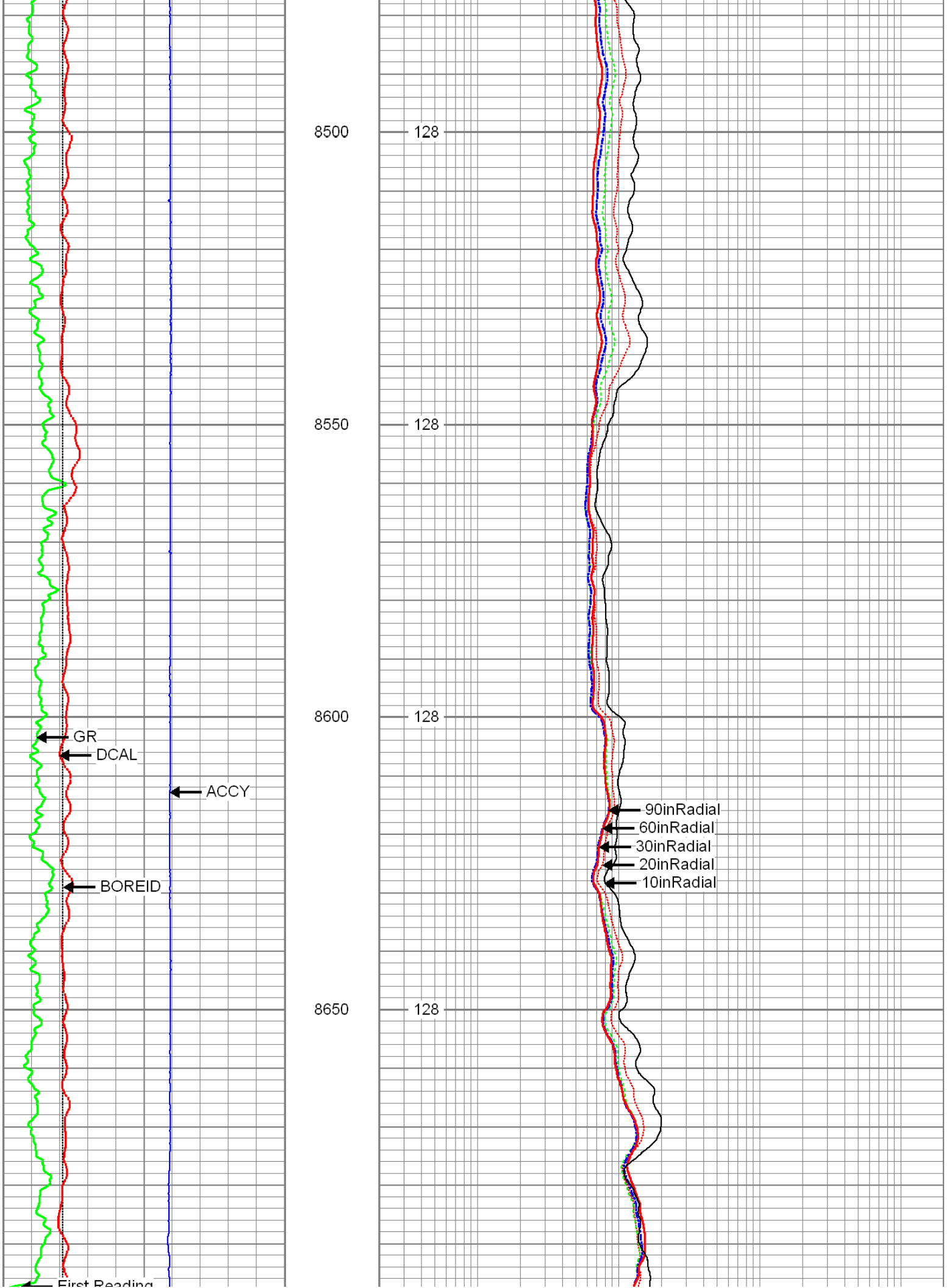
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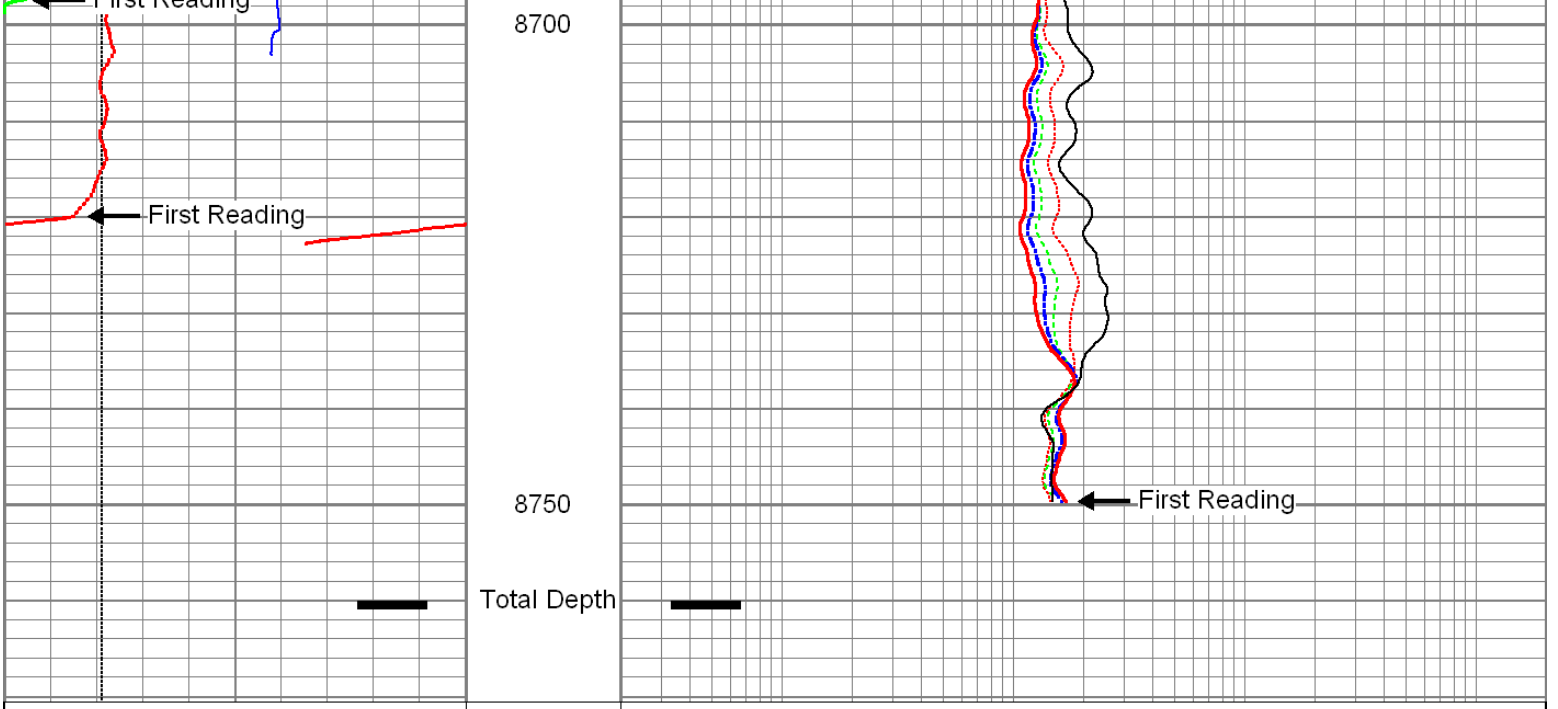
10inRadial
First Reading



0	GR (GAPI)	150
4	BOREID (in)	14
4	DCAL (in)	14
-5	ACCY	5

0.2	20inRadial (Ohm-m)	2000
0.2	30inRadial (Ohm-m)	2000
0.2	60inRadial (Ohm-m)	2000
0.2	90inRadial (Ohm-m)	2000
0.2	10inRadial (Ohm-m)	2000

GRTEMP (degF)

Log Variables

Database:C:\Warrior\Data\kerr_mem.db
Dataset: field/well/proc1/pass1.2

Top - Bottom

A	BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in
1	On	WBM	1	MUDCELL	CURVE	6.125
BOTTEMP degF	**CASED?**	**CASEOD in**	**CASETHCK in**	**CEMWATERSA kppm**	**CMNTTHCK in**	**DNBHC?**
130	No	4.5	0	0	0	NO
DPORSEL	**FLUIDDEN g/cc**	**FRMSALIN kppm**	**LATNOR**	**M**	**MATRXDEN g/cc**	**MUDSALIN kppm**
RHOB	1	0	Off	2	2.71	1.5
MudWgt lb/gal	**NPORSEL**	**PEBHC?**	**PERFS**	**RESTMPSRC**	**SO in**	**SRFTEMP degF**
8.9	Limestone	YES	0	INTERNAL	0.5	65
SZCOR	**TDEPTH ft**	**TMPCOR**	**TOOLPOS**			
On	8806	On	Free			

Calibration Report

Database File: kerr_mem.db
Dataset Pathname: proc1/pass1.2
Dataset Creation: Wed Sep 19 11:30:58 2012

ThruBit Induction Calibration Report

Tool Model-Serial Number:	PS-PS28R
Shop Calibration Performed:	Wed Jul 18 08:34:18 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-470.6010	[-500.00, -400.00]	431.3580	[-500.00, 500.00]
A2	-132.1350	[-180.00, -100.00]	324.4270	[-500.00, 500.00]
A3	-22.8796	[-50.00, -10.00]	120.7910	[-500.00, 500.00]
A4	-13.5561	[-30.00, -10.00]	253.5500	[-500.00, 500.00]
A5	-12.3674	[-30.00, -10.00]	118.4800	[-500.00, 500.00]
Freq 2				
A1	-245.4520	[-280.00, -180.00]	255.0510	[-500.00, 500.00]
A2	-84.9942	[-130.00, -50.00]	181.0010	[-500.00, 500.00]
A3	-17.6024	[-50.00, -10.00]	27.4555	[-500.00, 500.00]
A4	-16.9413	[-30.00, -10.00]	79.3693	[-500.00, 500.00]
A5	-17.1391	[-30.00, -10.00]	-18.1150	[-500.00, 500.00]
Freq 3				
A1	-154.6260	[-180.00, -80.00]	114.8480	[-500.00, 500.00]
A2	-64.9929	[-130.00, -30.00]	89.0047	[-500.00, 500.00]
A3	-13.6178	[-50.00, -10.00]	-36.1076	[-500.00, 500.00]
A4	-18.2614	[-30.00, -10.00]	-34.9519	[-500.00, 500.00]
A5	-18.7199	[-30.00, -10.00]	-117.8370	[-500.00, 500.00]
Freq 4				
A1	-83.3030	[-120.00, -40.00]	-82.4238	[-500.00, 500.00]
A2	-47.3494	[-110.00, -10.00]	-31.3377	[-500.00, 500.00]
A3	-11.7928	[-50.00, -10.00]	-130.2940	[-500.00, 500.00]
A4	-22.0521	[-30.00, -10.00]	-204.6810	[-500.00, 500.00]
A5	-24.7190	[-30.00, -10.00]	-286.7100	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9892	[0.95, 1.05]	0.0017	[-0.05, 0.05]
A2	0.9915	[0.95, 1.05]	0.0036	[-0.05, 0.05]
A3	0.9962	[0.95, 1.05]	-0.0037	[-0.05, 0.05]
A4	0.9881	[0.95, 1.05]	0.0052	[-0.05, 0.05]
A5	0.9891	[0.95, 1.05]	0.0031	[-0.05, 0.05]
Freq 2				
A1	0.9832	[0.95, 1.05]	-0.0065	[-0.05, 0.05]
A2	0.9849	[0.95, 1.05]	-0.0051	[-0.05, 0.05]
A3	0.9838	[0.95, 1.05]	-0.0053	[-0.05, 0.05]
A4	0.9828	[0.95, 1.05]	-0.0039	[-0.05, 0.05]
A5	0.9822	[0.95, 1.05]	-0.0054	[-0.05, 0.05]
Freq 3				
A1	1.0029	[0.95, 1.05]	-0.0058	[-0.05, 0.05]
A2	1.0053	[0.95, 1.05]	-0.0043	[-0.05, 0.05]
A3	1.0006	[0.95, 1.05]	-0.0023	[-0.05, 0.05]
A4	1.0023	[0.95, 1.05]	-0.0028	[-0.05, 0.05]
A5	1.0053	[0.95, 1.05]	-0.0038	[-0.05, 0.05]
Freq 4				
A1	0.9934	[0.95, 1.05]	-0.0036	[-0.05, 0.05]
A2	0.9954	[0.95, 1.05]	-0.0025	[-0.05, 0.05]
A3	0.9956	[0.95, 1.05]	-0.0046	[-0.05, 0.05]
A4	0.9952	[0.95, 1.05]	-0.0015	[-0.05, 0.05]

A5	1.0041	[0.95, 1.05]	-0.0046	[-0.05, 0.05]

Temperature 31.0160 degC

ThruBit Density Calibration Report

Tool Model-Serial Number: PS-PS41D

Source Number:

Shop Calibration Performed: Mon Sep 17 12:15:02 2012

REFERENCE

	Density	Units
Aluminium	2.607	g/cc
Magnesium	1.752	g/cc

READINGS

Outputs	Counts	Units	Expected
SS1 Background	144.02	cps	[130.00, 170.00]
LS1 Background	160.64	cps	[130.00, 170.00]
LS4 Background	33.25	cps	[27.00, 35.00]
SS1 Aluminium	4608.35	cps	[4500.00, 5500.00]
LS1 Aluminium	839.19	cps	[750.00, 950.00]
LS4 Aluminium	902.92	cps	[843.00, 1068.00]
SS1 Magnesium	7683.51	cps	[7000.00, 9000.00]
LS1 Magnesium	5402.56	cps	[5250.00, 6250.00]
LS1 Al + Fe	729.52	cps	[650.00, 800.00]
LS4 Al + Fe	412.65	cps	[382.00, 471.00]

RESULTS

SS Slope	1.63	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	4.909	[3.510, 6.170]
PEF B Factor	-0.525	[-0.700, -0.410]

Caliper Shop Calibration performed: Mon Sep 17 12:15:02 2012

RESULTS

Reference	Reading	Units
12.00	1851.79	in
9.00	2020.34	in
6.00	2185.40	in

DENSITY PRE-SURVEY CHECK Performed: Mon Sep 17 12:52:36 2012

Outputs	Counts	Units	Expected
SS1 Background	143.34	cps	[139.70, 148.34]
LS1 Background	159.89	cps	[155.82, 165.46]
LS4 Background	33.31	cps	[31.25, 35.24]

CALIPER PRE-SURVEY CHECK Performed: Mon Sep 17 12:50:20 2012

Reference	Readings	Units	Expected

6.00	6.05	in	[5.80, 6.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number:	PS-PS05N
Source Number:	
Calibration Tank Temperature:	90.6 degF
Shop Calibration Performed:	Thu Sep 06 13:38:31 2012

BACKGROUND MEASUREMENT

Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	856.4	cps	
LS Counts	28.4	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	30.1747	SS/LS	
Tank Ratio Gain	1.0260		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	9376.9	cps	
LS Counts	906.5	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	10.613	SS/LS	
Al Ratio Gain	1.02		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Mon Sep 17 12:57:08 2012

Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

Gamma Ray Calibration Report

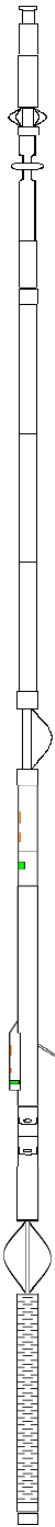
Tool Model-Serial Number:	ENP-ENP2T	
Performed:	Thu Sep 06 14:53:24 2012	
Calibrator Value:	170.8	GAPI
Background Reading:	62.6	cps

Calibrator Reading:	476.3	cps
Sensitivity:	0.3850	GAPI/cps

Inclinometer Calibration Report

Performed: Sun Jun 13 14:33:21 1993

	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	0.00	1.00	0.00	1.00	gee
Y Accelerometer	0.00	1.00	0.00	1.00	gee
Z Accelerometer	0.00	1.00	0.00	1.00	gee

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
Thrubit	89.84		Cablehead-S Solid Weakpoint	2.31	2.13	5.00
Thrubit	87.53		PSBDOT	3.87	2.25	35.00
Thrubit	83.66		HangOff_Tool	5.00	2.38	60.00
Thrubit	78.66		Swivel	2.25	2.06	25.00
Thrubit	76.41		10-1	0.75	2.13	3.95
TBBAT	75.66		TBBAT-A (PS07B) Thrubit Battery	6.13	2.13	38.20
TBBAT2	69.54		TBBAT2-A (PS13B) Thrubit Battery	6.13	2.13	40.00
TMG	63.41		TMG-ENP (ENP2T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
GR	63.29					
GRTEMP	62.45					
Thrubit	57.29		Decentralizer Decentralizer (Small)	4.50	2.13	70.00
CNLSC	50.85		TBN-PS (PS05N) ThruBit Neutron	4.77	2.13	63.00
			TBD-PS (PS41D) Thrubit Density	10.48	2.13	91.00
LSW1	40.29					
DCAL	39.38					
Thrubit	37.54		Knuckle	1.42	2.13	11.50
Thrubit	36.13		Knuckle	1.42	2.13	11.50
DT	26.54		TBS-A (TBS20) Thrubit Sonic -- Initial Support	16.46	2.13	75.00
TT	26.54					
RmbPk	26.54					
WVF1	26.54					
WVF2	26.54					
WVF3	26.54					

WVF4	26.54				
WVF5	26.54				
WVF6	26.54				
WVF7	26.54				
Thrubit	18.25				
A1_P	10.60		TBI-PS (PS28R) Thrubit Induction	15.29	2.13	94.00
A2_P	10.10				
A3_P	9.35				
A4_P	8.35				
A5_P	6.60				
			Sonic Centralizer	2.96	2.13	22.60

Dataset:	kerr_mem.db: field/well/proc1/pass1.2
Total Length:	89.84 ft
Total Weight:	690.75 lb
O.D.	2.38 in

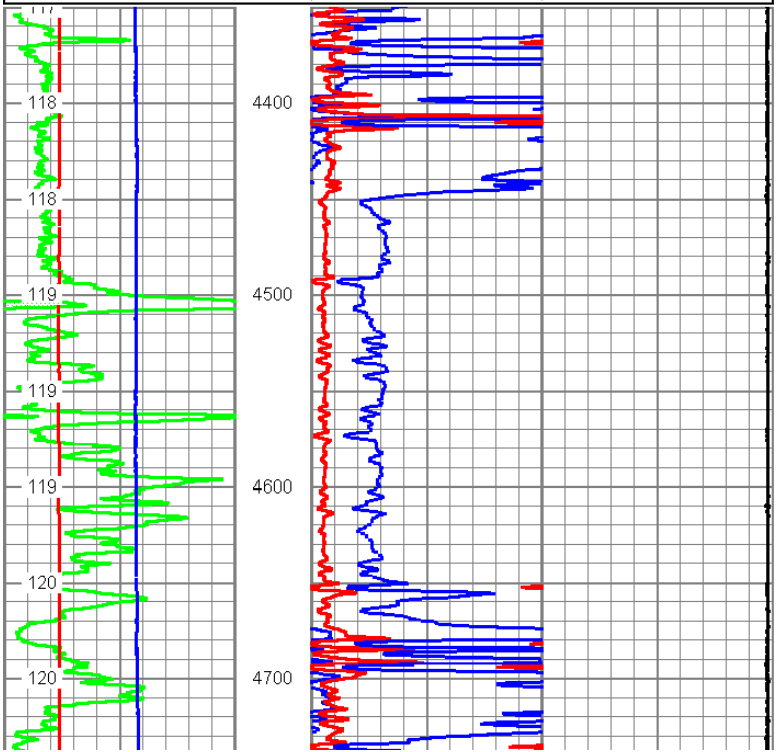
ThruBit
A Schlumberger Company

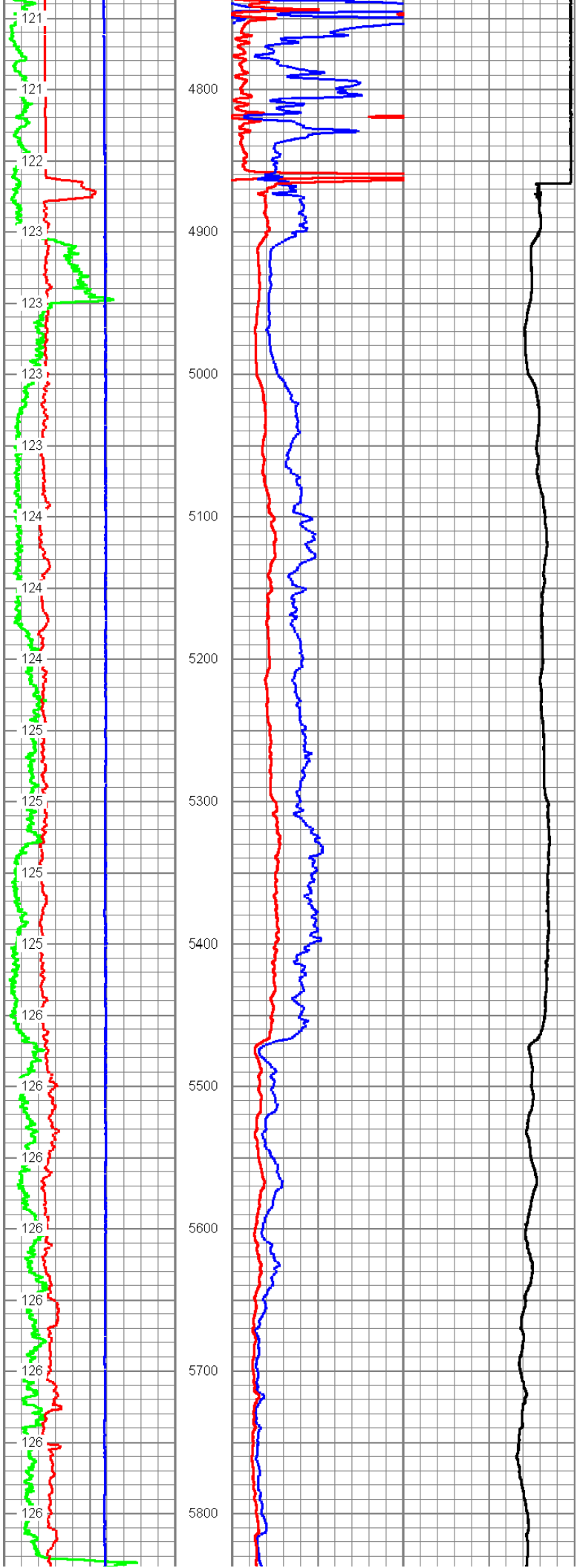
Company	ENCANA OIL & GAS (USA) INC.
Well	KERR 1H-2
Field	KERR
County	NESS
State	KANSAS

ThruBit
A Schlumberger Company

MAIN PASS

Database File:	kerr_mem.db
Dataset Pathname:	proc1/pass1.2
Presentation Format:	6_1r_chk
Dataset Creation:	Wed Sep 19 11:30:58 2012
Charted by:	Depth in Feet scaled 1:1200

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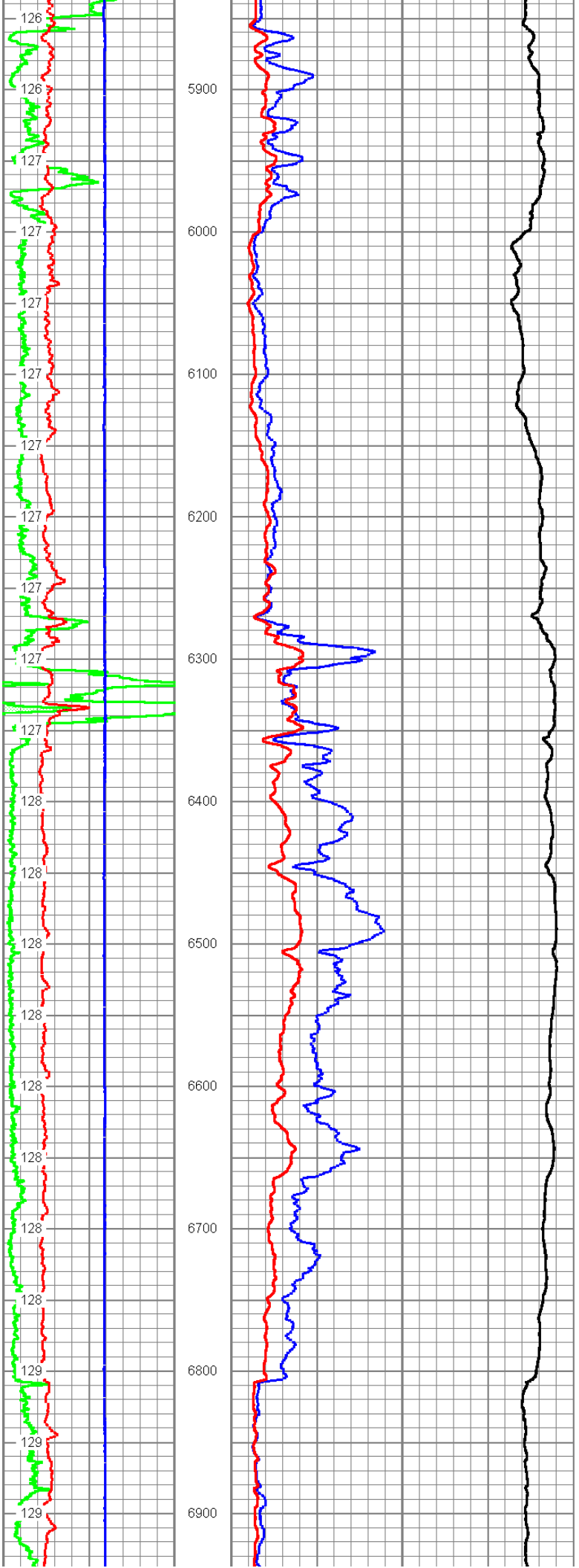
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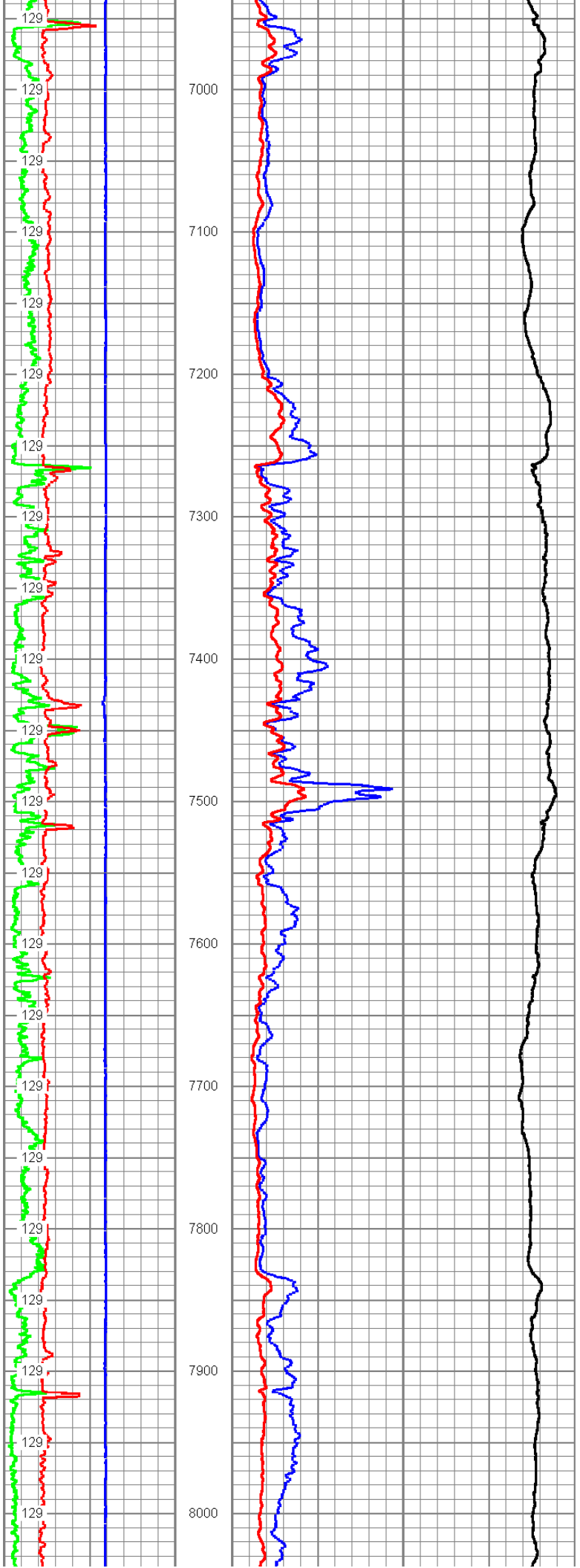
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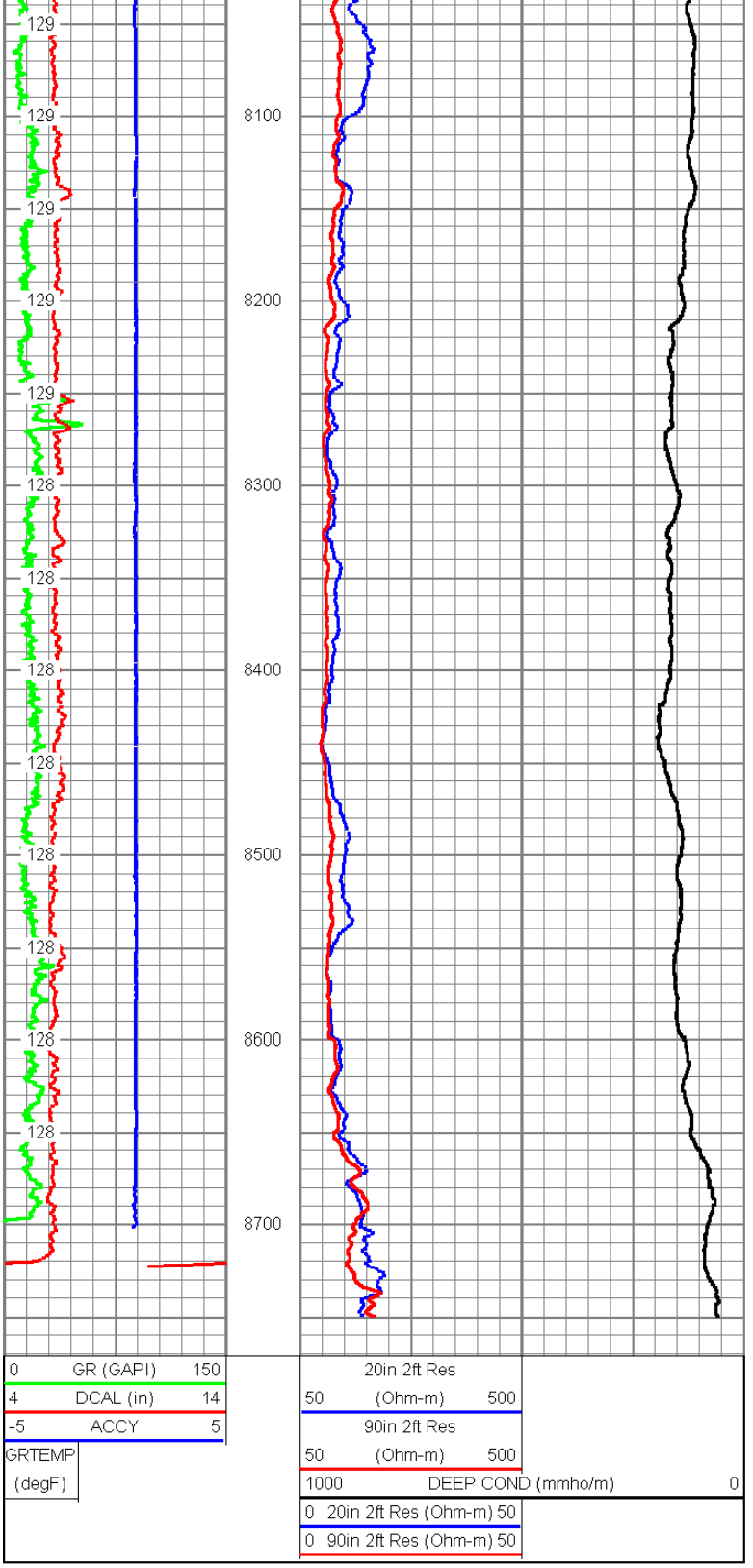
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8700
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4 DCAL (in) 14
-5 ACCY 5
GRTEMP (degF)
20in 2ft Res
50 (Ohm-m) 500
90in 2ft Res
50 (Ohm-m) 500
1000 DEEP COND (mmho/m) 0
0 20in 2ft Res (Ohm-m) 50
0 90in 2ft Res (Ohm-m) 50